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ABSTRACT

The primary goal of the Oregon nuclear age education curriculum is to develop in students the knowledge and skills needed to meet the challenges of living in a nuclear age. This curriculum is developed around five general themes, each corresponding to a specific unit. The general goals for the units are: (Unit 1) to increase students' exposure to the world outside themselves, to other cultures, and to the natural and physical world; (Unit 2) to increase students' critical thinking skills and understanding of how people make decisions and form attitudes; (Unit 3) to promote skills of constructive communication and conflict resolution; (Unit 4) to increase students' knowledge of nuclear technology and their understanding of its benefits and limitations; and (Unit 5) to increase students' understanding of armed conflict and modern weapons issues. This is a K-12 curriculum, but many of the topics in units 4 and 5 are more appropriate for older children. For the most part, the lessons should be integral parts of existing curricula. Care has been taken to provide teachers with examples of what might be done to promote nuclear age education in nearly all subject areas. The units are not designed to be taught in sequence and can be integrated into the curriculum whenever the teachers wishes. Whenever possible, lessons and activities should involve students in direct, first-hand experiences. The lessons presented can be adopted directly, adapted to a particular school's needs, or taken as suggestions of what might be developed. A bibliography lists 30 curriculum materials, 50 books, pamphlets, articles, 50 teaching resources, 21 organizations, 9 sources for nuclear statistics, and 11 supplements and bibliographies. (JB)

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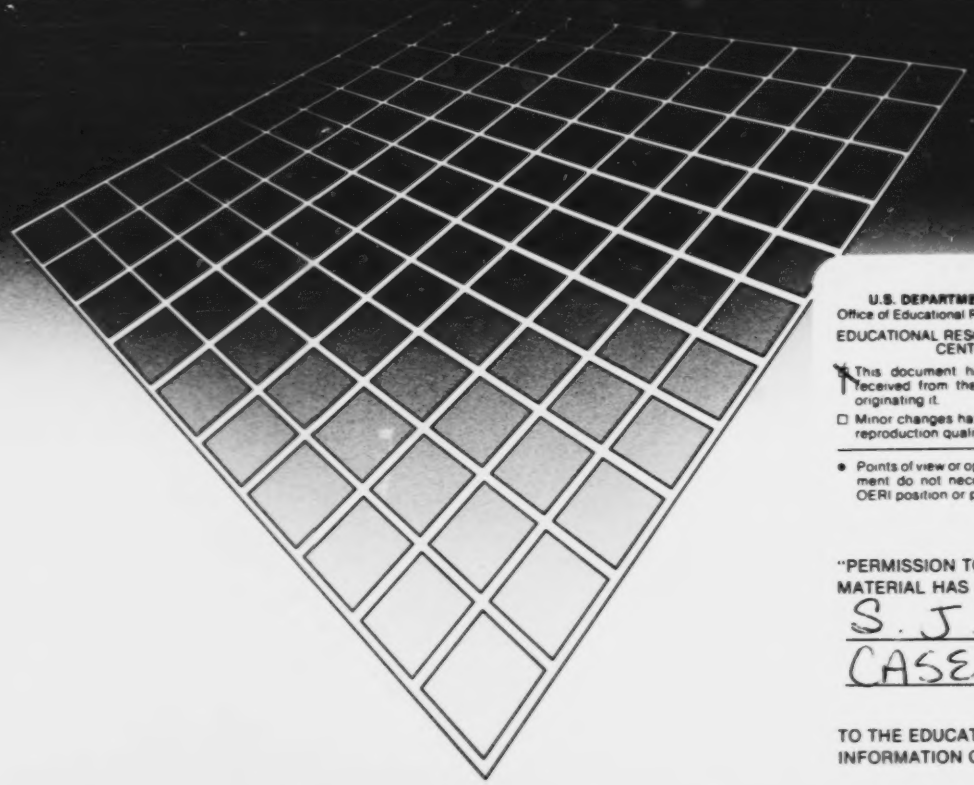
Nuclear Age Education Curriculum



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Oregon Department of Education, Salem, Oregon

Nuclear Age Education Curriculum

January 1989

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State Superintendent of
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Oregon Department of Education
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FOREWORD

The year 2000 is nearly upon us -- a mere decade away! Will our children be prepared to live in the nuclear age? What will they need to know and what skills will be called for that go beyond our present definitions of competence?

This curriculum guide presents a wealth of ideas to help students better understand cultural differences, to evaluate ideas, make decisions, communicate effectively and participate in events that affect our future as a society. School districts are encouraged to use the guide to develop their own local approaches to instruction in these areas.

In developing this guide, the Oregon Department of Education has endeavored to achieve balance, appropriateness and educational value. For more information contact Mary Jean Katz, Social Studies Specialist, 373-7900.

Verne A. Duncan
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TABLE OF CONTENTS

Page

Introduction

What is Nuclear Age Education? 1
History of the Nuclear Age Education Legislation 2
A Rationale for Nuclear Age Education 2
Goals of the Curriculum 3
Design of the Curriculum 4
Structure of the Curriculum 5
The Curriculum Development Process 6
Questions and Ideas for Implementation 7
ORS Chapter 417 8

Unit 1: Understanding the World and Its People 9
Cultural Awareness--
"Lullabies Link People" 13
"Key Country" Program 19
"Arctic Simulation" 21
"Customs and Culture of the Soviet Union" 31
"Significant Facts Regarding the Human Habitat" 35
"Potluck Hunger" 41
The Roots and Nature of Conflict Between Cultures--
"What Are the Causes of War?" 45
Global Interdependence: Environmental, Economic, Social--
"Interdependence Web:" - grades 4-6 51
"What's News--Global Links in the Media" - grades 7-12 51
"World in a Jar: A Closed Ecosystem as a Model for the Whole Earth System" 59
Contact with Different Communities and Culture Groups--
"Learning Something New" 67
"Global Pen Pals" 69
Community Service: Reaching Out to Help Others--
"Bridging the Gap Between Them and Us" 79

Unit 2: Examining Processes and Skill Development 85
Identifying Attitudes and Attitude Formation Processes--
"Super Detective" 89
Problem Solving--
"Learning and Using Problem Solving Strategies" 91
Critical Thinking--
"Fact or Opinion?" 93
Decision Making--
"Ex Comm and the Cuban Missile Crises" 99

Unit 3: Understanding and Practicing Communication 107
Conflict Management and Resolution Skills--
"Why do We Need Rules? 111
Cooperation Skills--
"Cooperation Activities for Elementary School Students" 113
"Practicing Non-Verbal Communication Skills" 115
"Stepping Stones to Successful Participation Projects" 117

Unit 3, Continued: Page

Communication Styles and Content--
"Improving Listening and Transmission" 123
"Recognizing Propaganda" 127
"The Peace of Paper" 130
Democratic Action: Using a Variety of Methods to Make Your Voice Heard--
"Learning Positive Ways to Express Emotions" 133
"Democratic Action: What are the Options?" 135
"Making A Difference--What Can I Do?" 137

Unit 4: Examining Nuclear Development and the Quality of Life 143
What is Nuclear Energy and How is it Produced?--
"Fission, Chain Reactions, and Fusion" 147
"The Physics of a Nuclear Explosion" 155
Benefits and Limitations of Nuclear Technology: Economic, Societal and Ecological Issues--
"What are the Uses of Radiation?" 165
"Investigations into the Benefits and Problems Resulting from the Use of Energy" 175
"Discovering and Evaluating the Many Uses of Nuclear Energy" . . . 177

Unit 5: Understanding Weapons Issues 181
The History and Changing Nature of Armed Conflict--
"What is Power?" 185
The History of the Nuclear Arms Race--
"Displaying Information on the Nuclear Arms Race" 189
"Deciding to Use the Atomic Bomb, 1945" 193
The Effect of the Arms Race on Local, National and International Economics--
"Military Spending by Other Countries" 201
The Debate: Potential Effects and Dangers of the Use of Modern Weapons--
"Civil Defense Debate" 209
"Nuclear Winter: Myth or Reality?" 213
"The Characteristics of a Nuclear Explosion" 215
Preventing War in an Armed World: Strategies and Institutions
"The Strategic Defense Initiative ('Star Wars')" 219
"The Strategic Defense Initiative (Women's International League for Peace and Freedom)" 221
Footnotes for Strategic Defense Initiative 228
"The Strategic Defense Initiative (Citizen's Defense Education Committee)" 231

BIBLIOGRAPHY

Curriculum Materials 239
Publications (Books, Pamphlets, Magazines, Articles 242
Teaching Resources 246
Organizations 250
Supplements and Bibliographies 252

What is Nuclear Age Education?

"The unleashed power of the atom has changed everything save our modes of thinking and we thus drift toward unparalleled catastrophes." Albert Einstein's 1946 observation has become a challenge, perhaps a warning. What can be done to change "our modes of thinking?"

Education may provide the best response to this challenge. Modes of thinking help form people's basic assumptions about themselves and the world around them--such thinking plays a fundamental role in the behavior of individuals and societies. Schools, along with families, churches and community organizations, are the primary places where most young people develop basic modes of thinking. When students go through the process of education, they are exposed to life's major themes: how to become an individual; how to live as part of the natural world; how families, communities and societies work. As proposed here, nuclear age education includes this tapestry of themes; indeed, it is composed mostly of them. But the new threads, representing nuclear-age developments, are added and sensibly woven into that fabric.

This nuclear age education curriculum consists of age-appropriate lessons and experiences designed to develop in students the knowledge and skills needed to meet the challenges of living in the late twentieth century. The curriculum includes a broad range of subjects and developmental levels and is drawn from many existing school programs. It builds upon what schools already teach--and value--adding new experiences, information and perspectives. In some cases, the curriculum may suggest placing greater emphasis on certain subjects or skills--basic science, foreign languages or current history, for example--than is presently given them. Nuclear age education will help students learn to include nuclear age issues among the other issues of life. Such education should allow people to examine and evaluate issues more fully, affirm valuable ideas more knowledgeably and develop new ideas and connections.

Since nuclear age education is broad-based and builds upon existing curricula, it is designed to be appropriate for students in grades K-12. Three additional points support the use of the curriculum at all age levels. First, many of the lessons teach information and skills with applications in several areas of life. Teachers and students at nearly every level find them useful in a variety of ways. These lessons should be applied to nuclear age issues when students are old enough, but they should be learned in earlier grades because of their importance in other, non-nuclear, areas. Second, although these "modes of thinking" are fundamental, they are not necessarily simple. Mastering them takes much work, consistent application, reinforcement and years of practice. Third, the K-12 design is appropriate for long-term learning at different development stages, because it teaches not only a body of knowledge, but essential human skills--cooperation, for example--which must be learned in appropriate ways at all ages. Without adequate preparation, people may face unreasonable expectations of their abilities to cope with current issues and problems.

Because of its design as a comprehensive, wide-ranging, K-12 curriculum, nuclear age education is not simply a program about nuclear weapons or a program which gives simple solutions to current problems. This curriculum strives to provide students with the basic tools to become well-rounded,

well-informed, responsible citizens of the modern world and thus represents education for a lifetime, small steps in a long journey. In its efforts to address basic assumptions, nuclear age education has humble goals. But it is also a courageous and creative enterprise, because the journey is new, unfamiliar and of great importance. The intention of nuclear age education is to include nuclear age issues with other fields of study, to give these new issues their proper place, to provide the most up-to-date skills and knowledge necessary to ensure a robust, peaceful world--a world, as a Kenyan proverb puts it, not only given us by our parents, but loaned us by our children.

History of the Nuclear Age Education Legislation

The nuclear age education curriculum was developed as directed by the Oregon State Legislature, HB 3223 (1987). A similar bill, HB 2719, was introduced in the 1985 regular legislative session. HB 2719 was relatively short (16 lines) and focused almost entirely on nuclear arms issues. It passed both houses but was vetoed by the Governor. In his veto statement, then-Governor Atiyeh wrote, "I do not believe it appropriate that the legislature mandate preparation of special curricula on topical, national issues. The fact that school districts "may" adopt or modify and implement the curriculum reinforces my view of this measure as unnecessary legislation."

Representative Wayne Fawbush (D - Hood River), the principal sponsor of HB 2719, reintroduced the nuclear age education curriculum bill as HB 3223 in the 64th regular session. Thirty-five legislators, representing Republicans and Democrats in both the House and Senate, co-sponsored the bill and it passed both houses. Unlike its predecessor, HB 3223 utilized ongoing state and local curricular development and specified (50 lines) a broader, more comprehensive educational approach. Like its predecessor, however, it stated that although the Oregon Department of Education was directed to prepare the curriculum, that curriculum was not mandatory in its implementation.

A Rationale for Nuclear Age Education

On July 1, 1987 Governor Goldschmidt signed HB 3223 into law. This law required the Department of Education to develop and make available to the educational community a comprehensive nuclear age education curriculum. The law also set forth some assumptions concerning the need for this type of curriculum:

> "...the existence and growing arsenals of nuclear arms and other weapons of mass destruction present risks and opportunities to human society unmatched in recorded time;

...dealing positively with these issues, at both individual and societal levels, requires advances in rational analysis and creative problem solving, improved skills in conflict resolution and a clearer understanding of how people form attitudes and reach decisions;
...it is the responsibility of public education, in conjunction with parents, to intellectually and emotionally prepare students to deal with major issues facing society;
...today's students, to become active and responsible participants in our society, deserve a balanced and comprehensive understanding of the nature and implications of the dangers we face and opportunities to develop knowledge and skills to meet the challenges. Failure to provide this education may result in critical ignorance and in feelings of confusion, hopelessness and despair..."

These are assumptions about important issues: risks of warfare, human capabilities, public responsibilities and the role of education. Some may debate the assumptions, but that is not a task for this curriculum. These statements from HB 3223 provide a clear rationale for nuclear age education.

There is a further rationale, which might be called "subject balance." Nuclear age education is not a part of most schools' curricula. When it is, the treatment is usually weak, brief, narrow, poorly integrated or excessively contentious. Nuclear age issues should not be overdone, nor left out. Whether the lessons are broad or specific, they should be taught along with, and reasonably connected to, already existing programs. This curriculum offers examples of how to do that. It also offers methods for examining difficult issues. In other words, this curriculum is responding to the absence of educational material and the difficulties encountered in teaching it. In all other aspects, nuclear age education is consistent with the current set of goals for Oregon Schools.

Goals of the Curriculum

The primary goal of nuclear age education is to develop in students the knowledge and skills needed to meet the challenges of living in a nuclear age. This curriculum is developed around five general themes, each corresponding to a specific unit, which contribute to the primary goal.

The general goals for the units are:

Unit 1: To increase students' exposure to the world outside themselves, to other cultures and to the natural and physical world.

Unit 2: To increase students' critical thinking skills and understanding of how people make decisions and form attitudes.

Unit 3: To promote skills of constructive communication and conflict resolution.

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* The entire text of the law is reprinted at the end of this section.

Unit 4: To increase students' knowledge of nuclear technology and their understanding of its benefits and limitations.

Unit 5: To increase students' understanding of armed conflict and modern weapons issues.

A more detailed explanation and rationale for each unit is provided at the beginning of each unit.

Design of the Curriculum

The design of this curriculum is based on several key characteristics:

1. **Age-appropriate**: Although this is a K-12 curriculum, not all topics or lessons are appropriate for all children, particularly those dealing with nuclear war or requiring sophisticated conceptual understanding. Many of the topics in Units 4 and 5 are more appropriate for older children. Much of Units 1, 2 and 3, however, is relevant to children at all grade levels, particularly because the goals are broad, requiring long journeys of small steps. Educators may teach the skills and content of these three units to very young children without dealing directly with issues related to nuclear war, whereas at the upper grades the learning in these units can be extended and reinforced using the content and concepts introduced in Units 4 and 5. Educators are cautioned to consider age-appropriate issues when using any lessons or activities in this curriculum or in developing additional lessons around these topics.

2. **Integration and infusion**: For the most part, the lessons should be integral parts of existing curricula. For example, experiential activities related to learning about other cultures should be a part of social studies and foreign language classes. Those activities can also contribute to nuclear age literacy. This curriculum is designed to suggest new directions, connections, ideas or "flavors," but entirely different textbooks, additional classes or new courses are **not** suggested.

3. **Cross-disciplinary**: Care has been taken to provide teachers with examples of what might be done to promote nuclear age education in nearly all subject areas and a variety of school activities. The tendency to pigeonhole nuclear education in science or social studies should be avoided, as this cheats students of the valuable contributions that can be made by other disciplines. Implementation of the nuclear age education curriculum should be taken into consideration by personnel in all subject areas.

4. **Non-sequential**: The units are **not** designed to be taught in sequence. For example, Unit 1 is not intended to be taught before Unit 2. Students, however, should not be expected to engage in critical thinking on the topics presented in Units 4 and 5 before receiving some instruction on the skills of rational analysis. Many of the specific

skills learned in Units 2 and 3 should be applied when addressing the topics in Units 4 and 5.

5. **Direct experiences**: Whenever possible, lessons and activities should involve students in direct, first-hand experiences. For example, presentations or readings about other cultures should not be accepted as adequate substitutes for students having direct contact with the people and customs of those cultures. Other examples of direct experience include hands-on lab activities in the sciences, arts and mathematics.

6. **Process importance**: Classroom processes (teachers' activities) are an essential part of education and have significant bearing on nuclear age education issues. **How** a lesson or activity is presented is as much a teaching tool as the content of that lesson. Thus, the goals of any lesson in the curriculum should be modeled and reinforced by the process employed to teach it. For instance, constructive dialog between teachers and students about an immediate, first-hand conflict is often preferable to an abstract lecture on the topic of conflict resolution.

7. **Specific examples and references**: The bulk of the curriculum is composed of specific examples of lessons and activities which, by design and necessity, are not comprehensive. They are intended to be used as is or to illustrate possibilities and stimulate modification and further development. It is expected that teachers, schools and districts will make adaptations and additions appropriate to their own students and circumstances.

8. **Diversity of sources**: The curricular examples are the collected efforts of many, not the work or viewpoint of any one. They showcase the work of a variety of fine educators. This collection models the diversity of ideas and methods that can contribute to better education about the nuclear age.

9. **Essential Learning Skills**: Many lessons and programs in the curriculum list Essential Learning Skills that might be taught or reinforced through the activities provided. Teachers are encouraged to integrate these and other Essential Learning Skills into the lessons on a consistent basis.

Structure of the Curriculum

Each unit begins with a "unit opener," a description of its main theme. The unit opener also suggests possibilities for integrating the material with the existing curriculum.

Next are examples--lessons, activities or programs. These can be adopted directly, adapted to a particular school's needs or taken as suggestions of what schools and teachers might develop in relation to the theme of the unit. They are not intended to exhaust the possibilities of valuable activities, but to offer a variety of stimulating examples.

A Resource List is provided at the end of the curriculum.

The Curriculum Development Process

Initial work at the Oregon Department of Education (ODE) toward fulfilling the requirements of HB 3223 began in the fall of 1987 with the preparation of a budget and timeline for the project. Because no funding was provided by the Oregon legislature for the development of the curriculum, a modest budget of $10,600 was prepared using ODE funds. This amount included the costs of development, printing and distribution. Distribution was scheduled for August 1, 1988, as mandated by the legislature.

In further response to the legislation (HB 3223, Section 2), approximately fifty individuals were invited to serve as advisors to the project. The names of these advisors are provided on pages v and vi. Advisors represented higher education, district school boards, school superintendents, administrators, counselors, classroom teachers (elementary and secondary), curriculum development organizations and students. They reviewed and critiqued the curriculum at various stages of its development. Their input helped give us a final product that is educationally sound and as free as possible of political bias.

Utilizing input from Representative Wayne Fawbush, it was decided that the curriculum would be developed using existing local and national curriculum resources. With the aid of the Legislative Research Office, the Department obtained copies of several nuclear age education guides and/or programs developed in other states. In addition, all public school principals in Oregon were mailed a letter asking them to alert teachers to the project and encouraging the submission of locally-developed lessons, programs or activities for possible inclusion in the curriculum. The response was small, but significant. Several of the best examples in this curriculum were submitted by Oregon educators.

The bulk of the developmental effort was performed by ODE staff and volunteers who solicited materials, sorted, filed and reviewed the resources that were collected, wrote or rewrote lessons to a standard format and assisted in editing the final product. Those volunteering their time and expertise are listed below. <u>Formating Lessons</u>: Elaine Rector (Corvallis School District), Julie Wheeler (Riverdale School District), Rod Harvey (Philomath School District), Marjorie Covey (Marion ESD), John Kuppenbender (Mt. Angel School District), Marilyn Kirk (Silverton School District), Elaine Mattson (Beaverton School District), Nick Karafotias (Centennial School District), Dale Koger (Silverton Union High School District), Christie Ford (Lake Oswego School District) Susan Knapp and Susan Isaacs (Portland School District), Don McGinnis (Forest Grove School District), Ric Blasquex (Greater Albany Public Schools), Tom Swinford (Lincoln County School District), Greg Bradstreet (Central School District). <u>Sorting and Filing Lessons by Topic</u>: Susan Mountainspring, David Golden, Vi Nettleton, Duane Poncy, Elizabeth Parker, Nancy Baker-Kroft, Doyne Deos, Pat Gorman, Cathy Barton, Peter Moore, Don Skinner (members of Salem Peace Works). <u>Assistance in Preparing Publication</u>: Members of the Women's International League for Peace and Freedom (Portland Branch); Members of the Citizen's Defense Education Committee; Earl Molander, "The Pairing Project"; Dr. Martha Sherwood-Pike, University of Oregon Russian Department.

The Department also wishes to acknowledge the work of Steve Saslow, a teacher at The Catlin Gabel School in Portland, who developed the conceptual model upon which this curriculum is based and who wrote much of the introductory material and unit openers for the curriculum.

In addition to the fifty advisors who reviewed the curriculum during its development, numerous individuals provided feedback on the first draft. A public hearing in August and written testimony submitted by concerned individuals around the state were compiled in a report, which was submitted to the State Board of Education for its consideration. In addition, Superintendent Duncan appointed a nine member advisory committee to review the curriculum and make recommendations regarding revisions. A second draft was prepared, which was approved by the State Board on December 9, 1988.

In summary, this curriculum should be viewed as the collected effort of many dedicated individuals. Working on a short timeline with few financial resources, their major contribution to nuclear age education has been the development of a comprehensive framework, or outline, upon which a multitude of lessons and learnings can be attached. Local districts are encouraged to use this framework to develop or locate further examples to support nuclear age education.

Questions and Ideas for Implementation

It is expected that teachers and others will study this curriculum and make adaptations. This is consistent with the legislation. Below are some questions and ideas which exemplify how educators might begin adapting the curriculum to their own teaching.

-- How does the overall theme of this unit compare with themes I teach? How should this affect the way I work?
-- As a matter of degree, do I touch on this theme more (or less) than the unit appears to suggest? What is the unit's perspective? What is mine?
-- Should I shorten or drop some lessons to make room for several of these examples?
-- Should I splice or add aspects of the examples to my lessons? Should I build this theme into what I already teach?
-- What methods am I using in the classroom? How do these compare with the processes suggested in the unit?
-- I would like to do something like that example (or unit), but I want to prepare it my own way. I will check the bibliography for sources.
-- I like the idea of this lesson (or unit), but it seems too long (or not long enough); I will prepare a shorter (longer) version myself.
- I want to do a lot of these, but practically I can do only a few. So I will!

CHAPTER 417

AN ACT HB 3223

Relating to education.

Whereas the existence and growing arsenals of nuclear arms and other weapons of mass destruction present risks and opportunities to human society unmatched in recorded time; and

Whereas dealing positively with these issues, at both individual and societal levels, requires advances in rational analysis and creative problem solving, improved skills in conflict resolution and a clearer understanding of how people form attitudes and reach decisions; and

Whereas it is the responsibility of public education, in conjunction with parents, to intellectually and emotionally prepare students to deal with major issues facing society. Meeting this duty requires nuclear age education; and

Whereas today's students, to become active and responsible participants in our society, deserve a balanced and comprehensive understanding of the nature and implications of the dangers we face, and opportunities to develop knowledge and skills to meet the challenges. Failure to provide this education may result in critical ignorance, and in feelings of confusion, hopelessness and despair; and

Whereas school districts will benefit from having available to them a developed curriculum which can provide students, at appropriate ages, a balanced education in the risks we face whereby they can develop needed skills and understanding; now, therefore,

Be It Enacted by the People of the State of Oregon:

SECTION 1. (1) The Department of Education shall prepare and make available to the educational community a comprehensive educational program affecting appropriate parts of the curriculum, to:

(a) Improve dispute and conflict resolution skills and encourage creative problem solving;

(b) Provide understanding of other cultures and the roots and nature of conflict between cultures;

(c) Communicate insight into how attitudes are formed and decisions are made;

(d) Present to students, as is appropriate to their ages, a balanced discussion of the following topics:

(A) The history of the arms race;

(B) The short, intermediate and long-term dangers of the use of modern weapons of mass destruction;

(C) The changing nature of armed conflict; and

(D) The effect of the arms race on national and local economies.

(2) A school district may adopt or modify and implement the educational program described in subsection (1) of this section at the district's discretion.

SECTION 2. In complying with the requirements of section 1 of this Act, the Department of Education shall consult and seek advice from representatives of at least the following:

(1) Higher education;

(2) District school boards;

(3) School superintendents;

(4) School administrators;

(5) Classroom teachers at both elementary and secondary levels;

(6) School counselors;

(7) Curriculum development organizations; and

(8) Students.

SECTION 3. No later than August 1, 1988, the Department of Education shall make available the educational program described in section 1 of this Act and shall encourage its implementation in public school classrooms.

SECTION 4. The Department of Education shall report to the Sixty-fifth Legislative Assembly on the use and acceptance of the program with recommendations for its further use.

Approved by the Governor July 1, 1987

Filed in the office of Secretary of State July 1, 1987

UNIT 1 LESSONS

UNDERSTANDING THE WORLD AND ITS PEOPLE

Cultural Awareness--

"Lullabies Link People" 13

"Key Country" Program" 19

"Arctic Simulation" 21

"Customs and Culture of the Soviet Union" 31

"Significant Facts Regarding the Human Habitat" 35

"Potluck Hunger" 41

The Roots and Nature of Conflict Between Cultures--

"What are the Causes of War?" 45

Global Interdependence: Environmental, Economic, Social--

"Interdependence Web:" - grades 4-6 51

"What's News--Global Links in the Media" - grades 7-12 51

"World in a Jar: A Closed Ecosystem as a Model for the Whole Earth System" 59

Contact with Different Communities and Culture Groups--

"Learning Something New" 67

"Global Pen Pals" 69

Community Service: Reaching Out to Help Others--

"Bridging the Gap Between Them and Us" 79

UNIT 1: UNDERSTANDING THE WORLD AND ITS PEOPLE

Today's young people will grow to become the caretakers of tomorrow's world. They need to have enough knowledge of that world to make responsible decisions that may affect all communities, nations and cultures. Do students know as much as they should about the world outside themselves? Shouldn't they have the opportunity to learn more about the physical and natural world, both in their local communities and around the globe? Shouldn't they be familiar with people different from themselves, cultures different from their own?

The example lessons in Unit 1 provide responses to these questions. They illustrate ways to give students real experiences and direct contacts with the world outside themselves. Reading, discussions and lectures about other places and cultures will provide support for the main lessons.

Three main objectives underlie the lessons in this unit: to increase students' knowledge of the outside world, including direct experience; to enhance students' awareness of the rich diversity of human cultures and the complex balance of nature and humanity's place in it; and to provide students with a basis for understanding themselves, through interactions with other people and comparisons with different cultures. In the long run, increased understanding in these areas will help students make informed decisions about other cultures and take their places as responsible citizens in the nuclear age.

Teachers in these areas may be in the best positions to offer students activities involving direct experience:

- **Foreign Language and Social Studies**: language study; cultural activities involving food, clothing, celebrations, rituals or myths; trips to other countries; letter and student exchanges; simulations; guest speakers from other cultures.
- **Science**: lab study, field study and experimentation with the physical world (geology, astronomy, chemistry, physics) and living organisms (biology, ecology).
- **Arts**: exposure to arts and crafts of other cultures (including folk arts, graphic arts, woodworking, ceramics, textile arts, music, dance and theater).
- **Physical Education/Athletics**: models of competition and cooperation with other teams and communities; contact with others through sports exchanges and homestays.
- **Other interscholastic activities**: debate team; academic contests; model state and national governments; model United Nations.
- **Community service**: service activities at the school, local, regional, national or international level.

Teachers in these areas may be more likely to provide supporting lessons and activities:

- **Mathematics**: study of demographics and global statistics; exposure to mathematical patterns and techniques of other cultures.
- **Social Studies**: study of present-day nations and cultures and their histories; study of cultures and ethnic variety within the United States; comparative study of governments around the world.
- **English Language Arts**: study of literature from other cultures; study of interrelationship of languages; letter exchanges.

Topic: Cultural Awareness

Title: "Lullabies Link People"

Source: Reprinted from Myself and Others by Alexis Aquino-Mackels, David C. King, and Margaret S. Branson, ©1979 by Global Perspectives in Education, a program of the American Forum: Education in a Global Age, Inc., 45 John Street, Suite 1200, New York, NY 10038. Reprinted by permission.

Essential Learning Skills: 2.3 (d), 4.2 (c), 4.3 (b)

Suggested Grade Levels: K-3

Suggested Time: 3-4 class periods of 20-30 minutes each

Suggested Course Content: Music, social studies, English language arts

Objectives:

A. To hear and sing lullabies - old and new - which come from several different cultures.
B. To examine lullabies from various cultures to identify similarities and parallels among groups and societies.
C. To have students describe their own life experiences, relating how others have cared for them and how they, in turn, have cared for others younger than themselves.
D. To have students describe in their own words some of the functions which lullabies serve.
E. To compose a simple lullaby using lulling words from a language(s) not their own.

Comments to the Teacher:

Lullabies have been sung for centuries by people all over the world. They have been called "the original tranquilizers," "the first love songs a human hears," "folk music," "sleep rhythms," and a "means whereby caretakers of infants can release their feelings -- both their joys and their frustrations."

Lullabies have simple and direct appeal. Usually the words are of secondary importance. Emphasis is upon sound and rhythm. "Lulling" is their most important attribute.

"Lull" is a word which has come down to us from Roman times. In Rome, those responsible for the care of infants used the word "lalla" to quiet their charges. Other cultures have invented words comparable to lalla (see chart). But, while the words used for lulling may be different, lullabies the world over rely on the power of monotone to induce contentment and sleep.

Procedure: You might begin by asking the children if they know what the word "song" means. What songs do they like to hear? To sing? How or from whom did they learn those songs?

Next, ask the children to try to remember a time when they were much younger. Can they remember going to bed at night? How did they feel about going to bed? Who put them to bed? What bedtime routines, if any, did they follow?

Some children may recall a routine of watching a certain TV show, after which time going to bed was mandatory. Others may recall that someone told them or read them a story. Inquire about those favorite stories. What were they? Why did the children like them? How many of the children learned their favorite stories "by heart" so that they could tell if a page was skipped or certain parts omitted in the telling? Why do they think they wanted to hear the same stories over and over again? Why do they think the story-tellers may have tried to skip parts on some occasions?

Point out to children that, before they were old enough to watch television or to understand stories, their parents or caretakers may have used another way to get them to go to sleep. That method probably has been used everywhere, for as long as there have been people. Can the students guess what that means may have been? They may guess that it was by rocking and/or singing infants to sleep.

Say that there is a special name for the songs which people sing to babies when they put them to sleep. Each is called a lullaby. Then explain to the children a little about the purposes and the musical forms of lullabies.

Introduce the lullabies which are reprinted here. Let the children hear them, sing them, discuss them. (Note: You may prefer having the children sing the melodies with "lulling" words instead of those shown.)

Help the children to generalize as much as they can about the universal aspects of child care and the interdependence of infants and their caretakers.

To conclude the lesson, introduce the children to some of the "lulling" words used by people around the world (see chart). Select one or several of those lulling words and "compose" a lullaby which the children can sing. The lullaby can be as simple as just repeating the lulling words over and over, or setting them to a melody with which the children are already familiar.

You may wish to give special consideration to the ethnic background of your students when selecting the lulling words for your original composition. It may be that the children would enjoy and benefit from using words of countries from which their grandparents or great-grandparents came.

Point out on a map or globe the countries which were the source of the lulling words used in the children's own lullabies. Talk about each country and the people who live in it. If possible, show pictures of children who live in that country.

Extending the Lesson:

Students can be asked to bring to class snapshots or informal photographs of themselves as infants. Let each child describe what is happening in the photo he or she brings. Who is taking care of, playing with, comforting him or her? How does the student think that person is feeling? How does the student think he or she felt about that person? The photos can be arranged in a special bulletin-board display and the students might talk about the changes they perceive which have taken place in themselves and in their classmates since those photos were taken.

Many of the children probably have had experiences caring for younger brothers, sisters, or cousins. Encourage them to talk about those experiences and to think of ways in which they can be good caretakers. What stories could they tell or read to those younger than themselves? What lullabies or other songs might they sing to them? How might they comfort them or make them feel more secure? The point is to help children discover for themselves that they are capable of helping others and sharing their feelings. Knowing that they are competent improves the children's self-image, and a good self-image is one of the requisites for effective learning.

Evaluation:

A. Have students describe in their own words some of the functions which lullabies serve.
B. See "Objectives" and evaluate individual student participation in the activities.

Lull-Words From the World's Baby Language As Used in Lullabies

A-a-a	Lithuania	Lalo loli	Pakistan
Ahay, hay, hay	Gitksan Indian (Canada)	Ma ma ma	Yuma Indian (U.S.A.)
Ai-ha, zu zu	Latvia	Me me me me	Cree Indian (Canada)
Ai lu lu	Poland		
Arroro ro ro	Spanish-speaking countries	Na, na, ninna-nanna	Italy, Greece, Macedonia
'Awe'awe	Suni Indian (U.S.A.)	Nen nen	France, Japan
A-ya-ya	Trinidad	Ni-ni-ni-ni	Philippines
Baloo, baloo	Scotland	Ninni, ninni	Tunisia
Bayu Bayu	Russia	No no no nette	Switzerland
Bissam, bissam	Norway	Obauba	Basque
Bom pe, bom pe	Cambodia	Pi, pi, pi, pi	Yiddish-speaking people
Cha-chang, cha-chang	Korea	Shoheen-shal-eo	Ireland
Dengu, dengu	Indonesia	Su su su su	Estonia, Poland, Ukraine, Sweden
Dodo, dodo	France, French Pyrenees, Belgium, Haiti	Suze nane	Friesland (Netherlands)
Doyi, doyi	Ceylon	Tororo tororo	Guam
E-a, e-a, e-a	Czechoslovakia, Germany	Tprundy, tprundy	Russia
		Tulla lu lu	Lapland
Ha-o, ha-o	Kwakiutl Indian (Canada)	Tun, kurrun	Basque
		Tuu, tuu	Finland
Ho-ho	Egypt	Uaua	Basque
Hoi-yo, hoi-yo	Okinawa	We we we we	Chippewa Indian (U.S.A.)
Lala lai	Iran		
Lalla, lullay lull	English-speaking countries	Yee, le-le	Burma
		Yo yo yo yo	Bantu (Africa)

Source: Leslie Daiken, The Lullaby Book (London: Edmund Ward, 1959), p.9.

Russian

Idet Kozä Rogataia

Arranged by
David Branson

Gently Rocking
The nanny goat,
nanny goat, comes with sharp
horns and butts the child, and butts the
child, in the pants, who does not
drink its milk.

Whispering Wind

Japanese

arranged by David Branson

Topic: **Cultural Awareness**

Title: **"Key Country" Program**

Source: Beaverton School District 48, Elementary Department; Elaine Mattson, Curriculum Facilitator.

Essential Learning Skills: None

Suggested Grade Levels: K-6

Suggested Time: Throughout the school year as time allows and as it fits into the regular curriculum.

Suggested Course Content: Appropriate for all subject areas: music, literature, art, math, social studies, etc.

Objectives:
A. To recognize the cultural similarities and differences between the U.S. and the key country selected.
B. To describe cultural elements of the key country.

Procedure:

1. Select a country to be studied in small bits throughout the school year. Considerations in selection should be the appropriateness for the age level of the students, the resources available, your community, and how the study will fit with the regular curriculum.

   Beaverton teachers selected Pacific Rim countries because of Oregon's growing economic interdependence and social interchange with our neighbors across the Pacific. Each grade level selected a country. Selection may be by classroom or by school, if not by grade level.

   Examples: Beaverton kindergarten teachers selected China as their key country because of its family-centered culture. Its colorful costumes, New Year Festival, national symbol (the panda), folk tales, and the availability of Chinese food have made this study both fun and open to numerous possibilities for teachers. Resources are becoming plentiful.

   The U.S.S.R. was selected by fifth grade teachers because of its contribution to the regular social studies curriculum which focuses on U.S. History. The history, government, natural resources, and culture of the Soviet Union are studied and compared to similar elements in the United States. With the opening of cultural exchange, it is becoming increasingly easy to find resources and materials.

   Through the media, Australia's Bicentennial celebration in 1988 and its World's Fair Exposition have brought that country closer to the U.S. With the common thread of an English heritage, second graders have found the language and the people similar, yet different.

2. Rather than studying the country as a unit, lessons are taught throughout the year that use the key country as a focus of content while the objective of the lesson may be a process skill. For example:
   reading: stories that take place in that country; gathering information about the country
   literature: folk tales from the country, by authors from that country
   art: artists from the country; art projects in the form of the country's folk art (Ukranian eggs, kite making)
   geography: identifying major cities, rivers, mountains; comparing size, population, topography, etc.
   language arts: writing letters (pen-pals), stories, information pieces; oral presentations ("show and tell").

3. Check for resources:
   - in your library for books, films, kits, etc.
   - in your community for people (natives, travelers), places (field trips to stores, restaurants), things (artifacts)
   - on your newsstand for current news stories from the daily newspapers, weekly magazines, monthly journals
   - on TV for special events and programs
   - at consulates, embassies, travel bureaus

Extending the Lessons:

A festival day, celebrating the key country may be planned to include a presentation to other classes, parents, special visitors, etc. This may take the form of a play, a display of arts and crafts, artifacts, food sampling, sharing of stories, etc.

Evaluation: When the students have become so familiar with the country they have studied that they feel "akin" to it, that will be the mark of a successful venture. By touching another culture periodically throughout the year, they should gain a sense of familiarity that will transfer to understanding as they grow older.

Topic: **Global Interdependence: Environmental, Economic, Social**

Title: **"Arctic Simulation"**

Source: Reprinted with minor changes from Elementary Economics, Grades 4-6, Oregon Council for Economic Education, 1987, pp. 113-124. Adapted from Master Curriculum Guide for the Nation's Schools, Part II, Strategies for Teaching Economics: Junior High School Level (Grades 7-9), 1981, Joint Council on Economic Education, 1212 Avenue of the Americas, New York, NY 10036.

Essential Learning Skills: 6.2 (b-g)

Suggested Grade Levels: 5-9

Suggested Time: 2-3 days (40 mins/day)

Suggested Course Content: Social studies (economics, global studies)

Objectives:
A. To explain how productive resources are used to make goods that satisfy human wants.
B. To describe how efficiency results from specializing in production, from the division of labor, and from trade.
C. To use economic vocabulary to discuss world trade.

Generalization: Students will understand that in an attempt to use resources more efficiently to abate scarcity, nations of the world trade goods and services and as a result become interdependent.

Materials: "Rules for Arctic Simulation" (one copy per student), FISH, IGLOO and PONCHO drawings (2-3 copies, sufficient to post around the room so that all students can get to them), lots of white and yellow paper, easily cut cloth, five compasses, ten rulers, seven pencils, three scissors, three felt markers, two staplers, two green crayons.

Vocabulary: Efficiency: The production of as many goods and services as possible for the fewest possible resources.

Interdependence: Reliance of people on each other to get whatever they do not produce themselves.

Procedure: This activity should be done in three separate rounds.

Round One: The purpose of the first day's activity is to have the students experience the difficulty of producing a large quantity of goods with limited resources in a limited time. Most or all the students will be unable to do so and will therefore end Round One with feelings of frustration. Establish the mood for the activity by telling the class that they are lost on an Arctic island with little hope of rescue. The goal is that every student will be able to remain in this community. Pass out the RULES FOR ARCTIC SIMULATION. Have students read the handout.

Then go over it with them. Post the FISH, IGLOO AND PONCHO DRAWINGS on the wall in a convenient place for students to get to.

ASK: a. What basic needs must you satisfy in order to survive? (food, clothing and shelter)
b. What need does the fish model represent? (food)
c. What need does the igloo model represent? (shelter)
d. What need does the poncho model represent? (clothing)

Explain to the class that in order for all to remain in the community, they must produce one of each type of basic need for each class member within 15 minutes (you may wish to allow 20 minutes); i.e., for a class of 24, they must produce 24 fish, 24 igloos and 24 ponchos. If they fail to produce this amount they must remove from the community as many students as there is a shortage of any item.

Distribute the tools. Students may not introduce extra tools or break pencils in two to increase the supply.

Tell the students to begin. At this point, the role of the teacher is to enforce the rules. Be sympathetic and encourage those students who are slow starters or who want to give up. If students have questions, answer them one at a time and do not -- hurry, so as to make questions expensive in terms of lost production time. This helps them to feel the desperation in their situation.

If the whole activity breaks down because of the students' frustration or awareness of having no hope of completing the task, stop immediately. At the end of Round One collect all the materials and equipment and make sure everything is accounted for.

Round Two: The purpose of the second part of this activity is for the class to develop group cooperation and the idea of division of labor.

Begin with a review of the efforts made during Round One. If any students managed to remain in the community by completing all three reproductions, congratulate them.

Tell the students that today they get a second chance to do better under the same conditions. They will be given the same amount of time and the same equipment and resources. They will, however, first have a maximum of 15 minutes to discuss the problem as a class to see if they can work out better solutions. At

this point, the teacher should retreat from a position of dominance and make it clear that the students will have to work out their own solutions.

There is usually a minute or two of awkward silence but eventually every class responds. Note how decisions begin to be made. This is one of the most interesting periods in the simulation, for the group must determine whether decisions are going to be made on a democratic basis or whether it will follow the lead of a strong group or individual who makes decisions and gives orders. Every class seems to eventually organize itself into three groups--each producing one item.

Further specialization develops if the groups are organized so that each individual does just one step in the production process. Toward the end of the 15-minute planning period things become frantic as each group decides what resources are needed to complete its task and starts to negotiate with other groups for these items. If a group is well organized, everyone will have an important role to play and the resources to accomplish it. This is why it is important that there be a sufficient but not an abundant supply of resources and tools from the beginning. Some students can be efficiently employed as transporters of the finished goods to the teacher for approval and credit.

After 15 minutes, let them have the materials and begin a 15-20 minute production period.

Everyone is usually much busier and happier during this round. The teacher's main task is to keep a running total of approved units which have been produced. These units begin to flood in after the first 10 minutes of the round and things become wild as the end of the production period approaches. When the 20 minutes are up, collect the materials and equipment and tally the scores.

Round Three: Question the students to help them relate the simulation to economics. Questions that might be asked are:

a. What problems did you or your group face during Round One of the simulation?

Students will point out that there was a lack of tools and time, thereby preventing them from producing enough to satisfy their basic needs. Use their observations to introduce the problem caused by the abundance of human needs or wants compared to the limited means society has available to satisfy them, in other words, scarcity, a concept central to the study of economics.

b. Specifically, what did you need if you were to remain in the community?

Students will say that they needed paper, pencils and rulers, etc.--economic resources. Go on to name the three categories of resources or factors of production: natural, human and capital. Interestingly enough, students often overlook human resources (their own labor) as a factor of production necessary to remain in the community.

The materials and equipment used in the simulation should be related to the categories of natural resources (the paper and cloth are essentially products of the land) and capital (rulers, compasses, pencils, etc.). Students no doubt found that some systematic organization of production was also necessary, a discovery that helps reveal why societies develop economic systems in order to survive.

c. Explain how you organized yourselves in Round Two in such a way as to greatly increase production.

From the students' responses to this question you can develop some of the basic characteristics of economic organization in modern economies: division of labor, interdependence and trade. How did you decide what groups to form and what task each individual in the group would do? This question leads to a discussion of the decision-making process.

d. What basic problem did you try to solve during the planning period prior to Round Two?

Students should easily comprehend that they were trying to determine how they could most efficiently produce the food, clothing and shelter they needed to remain in the community.

e. What are the three basic economic questions any economic system must answer before it can solve the problem of survival?

Students should name:

- What to produce, in this case determined arbitrarily by the simulation which forced the production of fish, ponchos and igloos regardless of whether students may, for example, have preferred meat, raincoats and tents.

- How to produce goods, determined during the 15-minute planning session.

- The third economic question, for whom goods are to be produced, is one that students never deal with during the planning period. It never seems to occur to them and even if it did the shortness of the planning period would probably prevent them from arriving at a conclusion. Bringing up the issue leads to interesting discussions. Assume that in Round Two our hypothetical class of 24 was able to produce the following units.

Food	Clothing	Shelter
34	16	24

How many students remain in the community? Eventually they will see that since every person who was to remain needed at least one unit of each, only 16 out of the 24 students will remain in the community. Then comes the crunch: which 16?

Extending the Lesson: <u>Alternative Uses for Resources</u>

For whom goods and services are produced is one of the most perplexing questions in economics. If we produce for one area of the economy, then resources are not available for another. Discuss with students the implications of using resources for:

1. Heart transplants rather than advertisements against smoking.
2. More jail space rather than jobs programs.
3. Law enforcement against drunk driving rather than alcohol treatment centers.
4. Military buildup rather than domestic programs.

Evaluation: Students will know that interdependence refers to the relations among people, businesses, regions or countries that make the existence or actions of one necessary to the well-being of the other. It necessitates trade, creating different types of markets.

STUDENT HANDOUT

RULES FOR ARCTIC SIMULATION

SETTING: The class has been lost on an Arctic island with little hope of rescue. Your individual goal is to remain with the others in the community.

PROCEDURES AND RULES

1. You will each be required to produce one of each of the three types of basic goods corresponding to the model sheets that have been posted in the classroom.

2. Your reproductions from the models must be exact in every detail. No tracing of the models is allowed. The teacher may require you to improve any inexact reproduction or tear it up and tell you to start over and make another one. Use cloth to make the poncho model and paper to make the fish and the igloo.

3. When you complete a reproduction, hand it in to the teacher immediately in order to earn credit for it.

4. You may use only the equipment and materials your teacher supplies to you and you must not talk with other students until allowed to by the teacher. No extra pencils, etc., are permitted. You may not break the pencils in half.

5. Because some of the tools you will be using, especially the compasses, are potentially dangerous, no roughhousing will be allowed.

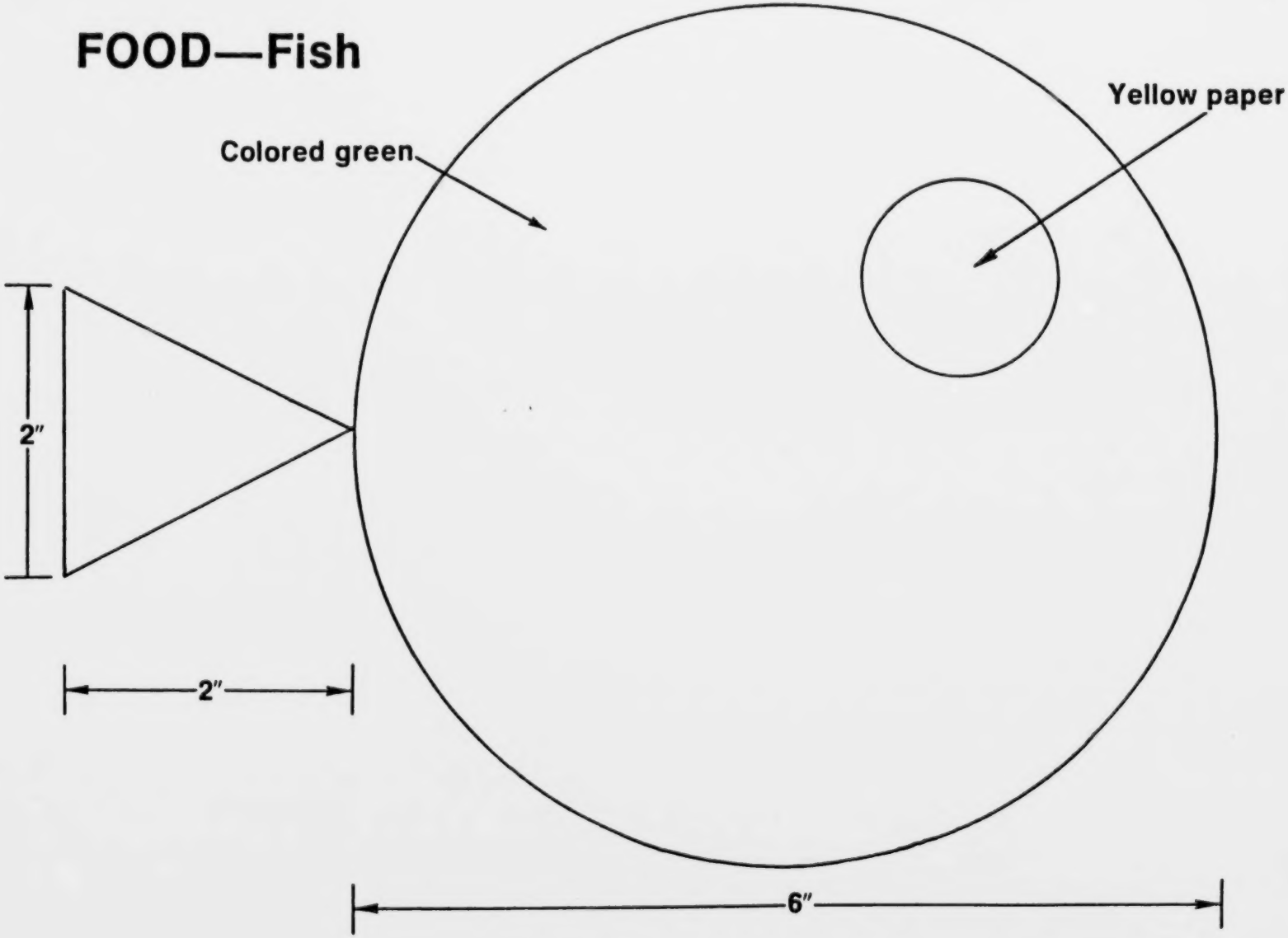
6. If you have any questions, the teacher will answer them for you individually. However, by asking questions you will be losing valuable production time.

7. The time limit for the task is 15 minutes, or 20 minutes, as the teacher specifies.

8. At the end of the allotted time, turn in materials, equipment and partially completed reproductions to the teacher.

From Master Curriculum Guide for the Nation's Schools, Part II, Strategies for Teaching Economics: Junior High School Level (Grades 7-9), 1981. Joint Council on Economic Education, 1212 Avenue of the Americas, New York, NY 10036.

FOOD—Fish

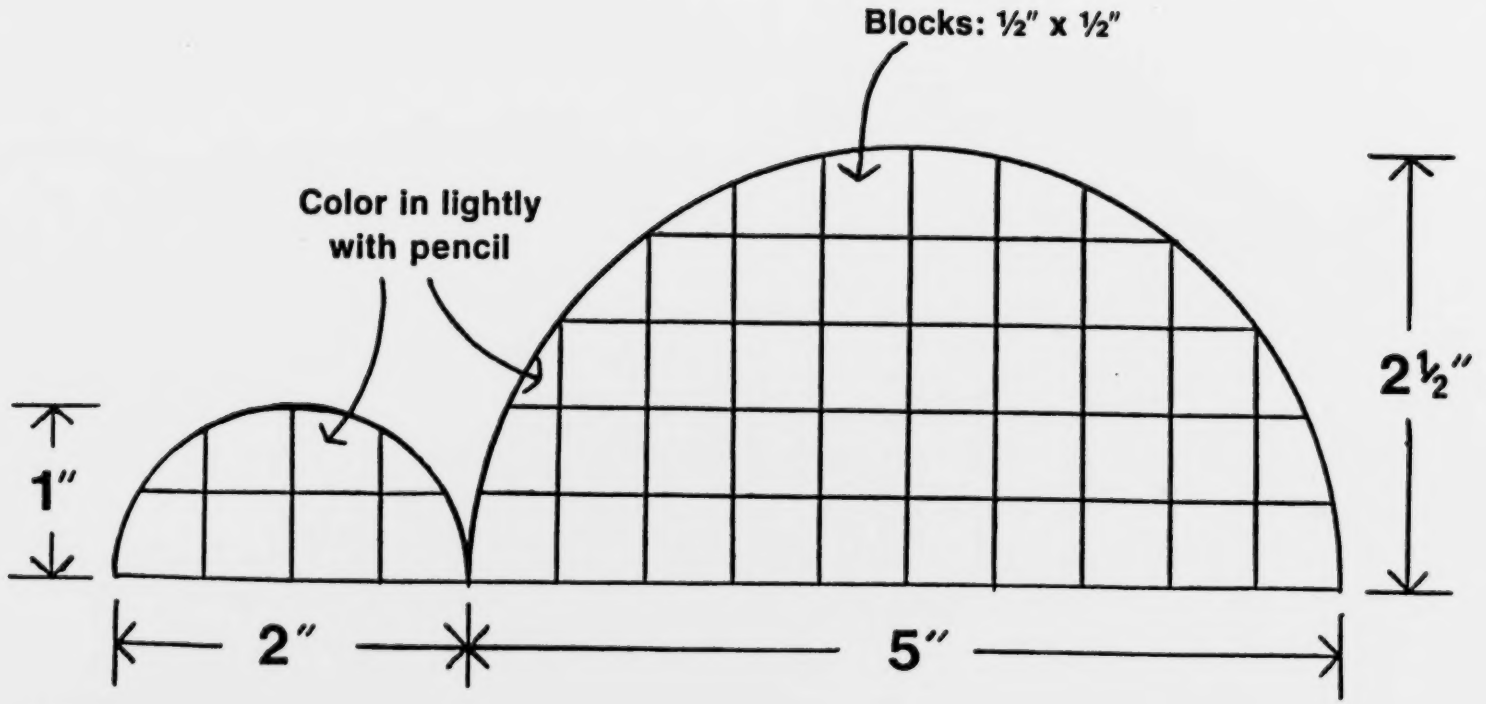


27

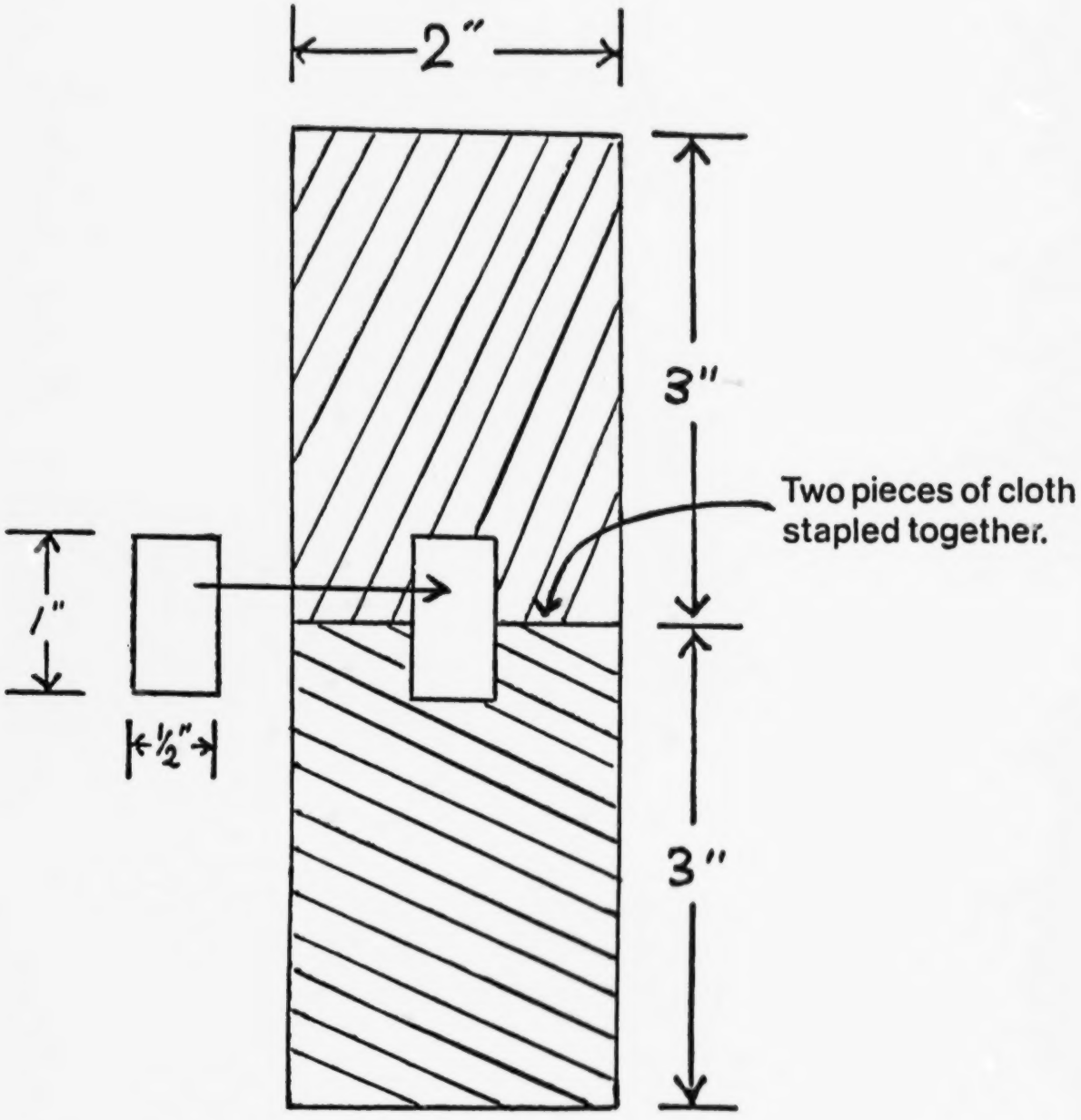
34

35

SHELTER—Igloo



CLOTHING—Poncho



Topic: **Cultural Awareness**

Title **"Customs and Culture of the Soviet Union"**

Source: Developed by Shari Levine, McKenzie River Elementary School (McKenzie School District), 51187 Blue River Drive, Finn Rock, OR 97488-9606.
Additional sources of information:

- Russian alphabet/phrases and Elementary School Life: The Pairing Project, PO Box 19049, Portland, OR 97219; (503) 245-3519.
- "The Bear" - Children's Games From Many Lands by Nina Millen, Friendship Press, 475 Riverside Drive, New York, NY 10115. ©1965. Used by permission.

Essential Learning Skills: Varies by activity

Suggested Grade Levels: 4-7

Suggested Time: Varies by activity

Suggested Course Content: art, English language arts, home economics, physical education, social studies

Objective: A. To identify and experience Soviet customs and various aspects of Soviet culture.

Procedure: **Engage students in one or more of the following activities:**

Russian alphabet and phrases
Introduce students to the Russian alphabet and language. Have students use the phrases provided when writing to Soviet pen pals (see "Global Pen Pals" activity, page 69. Soviet pen pals may be obtained from the California Association of Student Councils, 313 W. Winton Avenue, Hayward, CA 94544-1198. Send the name and address of each student, and your school name. The letters that your students receive will be in Russian so you will need to arrange for translation.

Russian Tea Cakes
Have students make (or sample) Russian Tea Cakes using the recipe below:

1/4 tsp. salt; 1 tsp. vanilla; 3/4 cup finely chopped walnuts; 1 cup butter; 1/2 cup powered sugar; 2¼ cups flour.

Combine all ingredients and form balls about one inch in diameter. Bake on greased cookie sheet at 400 degrees, 14-17 minutes. While hot, roll in powered sugar.

"The Bear" (8-30 players) (Game similar to "Tag.")
A square field is marked off to accommodate the players without too much crowding. Inside the square an oblong space is marked off (by drawing on the ground with a stick, or placing lines of stones) for the Bear's den. One of the children is chosen to be the Big Bear or the "Medvidisko" (Meedvedeesko). When over twenty are playing, more than one Big Bear is chosen and several groups take part.

The Bear goes into his den and the players move about the field. Suddenly the bear shouts from his den, "The Bear is coming!" He runs out of his den with his hands held together. He tries to catch a player by touching him with his locked hands. As soon as he has caught one, that player becomes a Bear and both run into the den.

They join hands and one of them announces, "The Bears are coming," and they go hunting in the field. They are allowed to catch only one player at a time by touching him/her with their free hands. They must always keep together and not break apart. When the Big Bear and Bear have succeeded in catching a third Bear, all three run into the den, join hands and advance again. The Big Bear always stays at the end of the line, which grows in length until all the players have become Bears. Any player who goes into the den or steps out of the field becomes a Bear. The last player to be caught becomes the Big Bear for the next game.
(Mrs. Lubow Hansen, Kiev, U.S.S.R. and Washington, D.C.)

Elementary School Life in the Soviet Union

Share the following information with your students, either orally or as a handout:

Soviet school children begin school at the age of seven, although many children will have gone to preschools and kindergartens which are in or near the apartment complexes where they live. The Soviet schools go from first grade to tenth grade. School hours are from 8:30-1:30, six days a week.

Because all the schools in the country are controlled by the Ministry of Education in the capital city of Moscow, and because there are no private schools, every Soviet child studies the same courses, using the same books at each grade level. The standard course of study is shown below:

NUMBER OF HOURS PER WEEK IN CLASSES

	Grade Level:	1	2	3	4	5	6
1.	Russian Language	12	11	10	6	6	4
2.	Russian Literature	--	--	--	2	2	2
3.	Mathematics	6	6	6	6	6	6
4.	History	--	--	--	2	2	2
5.	Nature Studies	--	1	2	2	--	--
6.	Geography	--	--	--	--	2	3
7.	Biology	--	--	--	--	2	2
8.	Physics	--	--	--	--	--	2
9.	Foreign Languages (Eng.)	--	--	--	--	4	3
10.	Art	1	1	1	1	1	1
11.	Music	1	1	1	1	1	1
12.	Physical Training	2	2	2	2	2	2
13.	Labor	2	2	2	2	2	2
14.	Primary	--	--	--	--	--	--
	Military Training						
TOTALS (Weekly)		24	24	24	24	30	30

In addition to school work, all Soviet students belong to clubs similar to Scouts, in which many after-school activities are organized--sports, crafts, music, etc. Unlike the Scouts, these clubs are run by the government. For children 7-9, the club is called the "Little Octobrists." For children 10-15, the club is called the "Young Pioneers." These clubs also sponsor summer camps. Russian children share the enthusiasm of American children for television. Almost every home has a TV set, although most are black and white.

- Discuss with students the similarities and differences between Soviet and American education.

Ukrainian Eggs

Prior to doing this art activity, provide information and show pictures of Faberge eggs (magnificently crafted jeweled objects d'art once exchanged among the Russian royal family at Easter).

Materials: pencil, tablespoon, candle, stylus with hoolow point, beeswax, four glasses of vegetable dyes (yellow, orange, red, black), a raw white egg, facial tissue.

Easter eggs decorated with intricate colors and designs have been a Ukrainian art form for centuries. The directions given below will allow students to produce a traditional Ukrainian motif. If you prefer, students may make their own designs. In either case the procedure is simple: a raw white egg is dipped into successively darker colors of dye, while areas to be protected against the dye at any stage are covered with beeswax.

1. Holding the pencil steady in one hand and rotating the egg in the other, draw a light pencil line completely around the egg lengthwise.
2. Draw another line crossing the first line at right angles, thus dividing the egg into quarters.
3. Draw a third, horizontal line around the middle of the egg.
4. Load the stylus (available from art supply stores) by scraping it over the beeswax, and hold the point briefly over a candle flame. Draw the stylus over the penciled lines on the egg.
5. Draw new lines with the stylus, bisecting the open areas and dividing each area into 6 triangles.
6. Place the egg in a spoon and dip it into the yellow vegetable dye. Gently pat it dry with a tissue.
7. Draw small circles in alternate triangles with the wax-loaded stylus.

8. Dip the egg in the orange dye (the waxed circles will remain yellow). Pat dry.
9. Place a dot of wax in the center of each circle.
10. Dip into the red dye and pat dry.
11. Draw fine diagonal lines in each of the remaining triangles.
12. Immerse in the black dye.
13. To make the colors gleam on the decorated egg, melt off the protective coats of wax by holding the egg over the flame, rotating and wiping it gently with a facial tissue.
14. The decorated egg will keep for years, long after its contents dry up. Keep decorated eggs out of direct sunlight so colors will not fade.

Evaluation: Have students write a paragraph or two describing what they have learned about the customs and culture of the Soviet Union from the above activities.

Topic: **Cultural Awareness**

Title: **"Significant Facts Regarding the Human Habitat"**

Source: Adapted from GLOBAL STUDIES - An Inquiry Course for Senior High Schools and Continuing Education. Developed by a consortium of specially trained teachers; funded by a Title IV-C grant through the New Jersey Department of Education. Available at cost. For further information contact: Center for U.N. Reform Education, 418 7th Street SE. Washington, D.C. 20003.

Essential Learning Skills: 2.2 (a); 7.2 (b,c)

Materials: Research Assignment (2-page student handout); Student Worksheet, "Basic Data on the Human habitat" (transparency master included with this lesson), clear transparency (optional), outline maps of the world (8 1/2" x 11").

Suggested Grade Levels: 9-12 (could be adapted to 6-8)

Suggested Time: 5 days

Suggested Course Content: Social studies (global studies, geography)

Objectives:
A. To acquire data relevant to an understanding of the physical and cultural world.
B. To practice research skills by using a wide variety of sources to acquire information.
C. To interpret data and formulate generalizations.

Procedure: Day 1: Distribute the Research Assignment student handout. Direct students to draw from memory an 8 1/2" x 11" map of the world, to label from memory the continents and oceans, and to answer (without using resources) the map questionnaire portion of the Research Assignment handout by placing the answer-number on the map. Map questions on the Research Assignment are marked by an asterisk (*). Collect rough maps for later comparison. (Note: Where have students located North America--center of page?)

Day 2: Project the transparency, "Basic Data on the Human Habitat." Inform students that their work for the next few days will involve library research to locate data that can be grouped into the five categories shown.

Days 2-3: For each of the five categories have a group of students collect data as required on the Research Assignment handout. Distribute the Research Assignment Worksheet. At end of scheduled library time, students return the worksheets to teacher for duplication for next day's use.

Day 4: Distribute copies of the five worksheets to each student for reading; then probe for generalizations, which might be written on a clear transparency. For homework, distribute an

accurate outline map of the world and re-assign "Day 1 Procedure," this time to be done with the help of the collected data.

Day 5: Students compare their two maps, review the worksheets and write a page on "What I learned" (teacher should note the "strata" of learning--facts, thoughts, generalizations, attitudes, values). Retain papers for course evaluation.

Use part of the class for a review and discussion on "What I Learned" and for a reconsideration of generalizations.

Extending the Lesson:

A. For Knowledge of Global Dynamics:
Students might be asked to draw maps showing world movement of various products: automobiles, TV sets, wheat, oil, etc. More sophisticated students might be able to draw maps showing capital flow before and after World War I or before and after the Arab oil embargo of 1973.

B. For Perspective Consciousness and Cross-Cultural Awareness:
Students might be asked to draw maps of the world from a variety of perspectives: social, cultural, physical, political, etc. Each shows a different aspect of the world.

C. Skills Lessons:
This lesson lends itself to teaching graphing skills. Ask students to draw pie graphs and/or two-axis graphs to display data such as: (1) GNP per capita for selected countries or continents, (2) calories and/or grams of protein per capita for selected countries or continents, (3) life expectancy, (4) literacy, (5) military spending, per capita or total, (6) the number of animals listed as in danger of extinction, (7) energy consumption, (8) gold prices, (9) peacekeeping expenditures, (10) known reserves of various minerals.

Evaluation: See Day 5 under Procedure section.

RESEARCH ASSIGNMENT

Label the continents of the world on the map.

SECTION I - PHYSICAL

1. Indicate on which continent the highest annual rainfall occurs and on which continent the lowest annual rainfall occurs.
* 2. Indicate on which continent the greatest annual food production takes place.
* 3. Indicate on which continent the lowest annual food production takes place.
* 4. Indicate on which continent the highest number of grams of protein per capita is consumed.
* 5. Indicate on which continent the lowest number of grams of protein per capita is consumed.
6. Indicate the major world-wide ocean and wind currents.
7. Locate the continent(s) where the following raw materials are produced: oil, coal, uranium, gold, diamonds, tin, iron ore, natural rubber, nickel, bauxite, zinc, manganese ore.
8. How many countries are there in the world today?
9. What is the percentage of land and the percentage of water on the earth's surface?

SECTION II - DEMOGRAPHIC

10. What is demography?
11. What is meant by the term "birth rate?"
12. What country has the highest birth rate? What country has the lowest birth rate?
13. What is the birth rate in the United States?
14. What is meant by the term "life expectancy?"
15. What country has the highest life expectancy rate?
16. What is the life expectancy in the United States (both for men and women)?
17. What is meant by the term "infant mortality rate?"
18. What country has the highest infant mortality rate? What country has the lowest infant mortality rate?
19. What is the infant mortality rate in the United States?
* 20. In what country is the population density (number of people per square mile) the highest?
* 21. In what country is the population density the lowest?
22. What is the population density of New Jersey?
* 23. What country has the highest literary rate?
* 24. What country has the lowest literary rate?
25. What is the literary rate in the United States?
26. What nation has the highest per capita income? What nation has the lowest per capita income?
27. What is the per capita income in the United States?
* 28. On which continent is the greatest number (percentage) of people employed in "white collar" jobs?
29. On which continent is the greatest percentage of people employed in agriculture jobs?
30. On which continent(s) are the following diseases still a major health problem: malaria, yellow fever, diphtheria?

*Questions to be identified on first map.

RESEARCH ASSIGNMENT

SECTION III -SOCIAL

* 31. On which continent is the country with the highest standard of living found?
* 32. On which continent is the country with the lowest standard of living found?
33. On which continent is the country with the highest number of unemployed located?

SECTION IV - POLITICAL

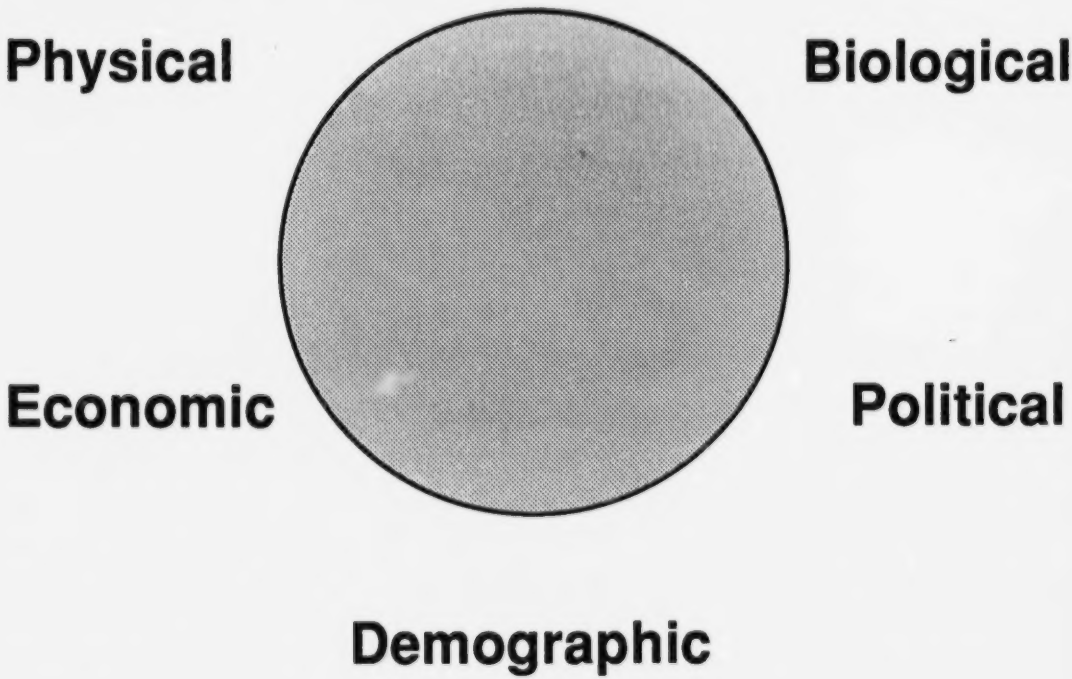
34. Identify the five major religions of the world and indicate where they are concentrated on the map.
35. Identify, on the map, the 12 major language regions of the world.
36. Indicate at least three different types of political organization and locate at least one country for each.
37. Locate and identify the 12 major political regions of the world.
38. Define the following climate regions of the world and name one country that fits each classification: tropical, subtropical, semiarid, desert, Mediterranean, marine continental, high latitudes.
39. Name and locate at least three political-regional or economical-regional organizations.

SECTION V - ECONOMIC

40. Define the following terms: have-not nations, underdeveloped nations, developing nations, developed nations, third world nations.
41. Locate on the map one country that exemplifies each of the above categories.
42. One which continent are the majority of countries developed?
43. What is meant by the term "gross national product?"
44. Which country has the highest gross national product? What country has the lowest gross national product?
45. What is the current gross national product of the United States?
46. On which continent are the majority of strategic national resources located?
47. On which continent are the majority of strategic natural resources consumed?
48. What is meant by the flow of international trade? Give at least three examples of international trade affecting the United States and (a) developed nations (b) underdeveloped nations?
49. Where is the greatest concentration of industrial output located?

*Questions to be identified on first map.

Basic Data on the Human Habitat



"Significant Facts Regarding the Human Habitat"

RESEARCH ASSIGNMENT: STUDENT WORKSHEET

NAME(S)_____DATE_____

DATA ON HUMAN HABITAT

Topic: **Cultural Awareness**

Title: **"Potluck Hunger"**

Source: Reprinted with minor changes from The World Citizen Curriculum, Department of Education, State of Hawaii, RS 85-8654, September 1985.

Essential Learning Skills: 1.4 (b), 2.3 (d), 3.1 (a,b,d), 4.2 (a), 6.3 (c,f)

Suggested Grade Levels: 7-10

Suggested Time: 1-2 days

Suggested Course Content: Social studies (global studies, economics), home economics

Objectives:

A. To experience through a simulation activity the disparity in wealth and resources which exists in the world today.
B. To formulate generalizations that explain the distribution of population, resource consumption and food distribution among the major land areas on Earth.

Materials: Continental birthplace cards, hat from which students draw their birthplace cards, classroom chairs, plastic knives, bread and butter, fruit juice.

Procedure:

1. Divide the room into 12 parts with Europe represented by 1/12 of the space, North America 2/12, Latin America 2/12, Africa 3/12, Asia 4/12. Have large world maps and/or signs designating each continent (Latin America includes Mexico, and Europe includes the Soviet Union to the Ural Mountains).

2. Prepare in advance continental birthplace cards in proportion to the population percentages in Table 3. It is important that students randomly draw birthplace cards out of a hat or fish bowl, highlighting the fact that it is not by anyone's design or particular virtue that they were born where they were. Each person is to remain in his/her continent (sitting on floor or standing).

3. Divide up the chairs, knives, bread and butter in proportion to the percentages given in the following tables. Distribute chairs in each area according to % per capita GNP, as in Table 4.

4. Distribute knives according to % per continent in Table 4.

5. Distribute bread and butter according to % per capita of animal protein consumption in Table 5.

6. Optional: Tell the class that they are to decide as a planet how the fruit juice is to be distributed. Let the distribution proceed according to what the group decides.

Table 1
Land-People Distribution Area

Continent/Region	Total Land Area	Area Under Cultivation
Africa	11,700,000 sq. miles	5%
Asia	17,100,000 sq. miles	12%
Europe	3,800,000 sq. miles	17%
Latin America	7,800,000 sq. miles	4%
North America	7,600,000 sq. miles	12%

Table 2
Population Density
(Population / Square miles of land)

Africa: 31.1 people/sq. mile
Asia: 129.65 people/sq. mile
Latin America: 38.1 people/sq. mile
North America: 29.26 people/sq. mile
Europe: 172.1 people/sq. mile

Table 3
Population

Continent/Region	Total Population	% of World Population
Africa	412,000,000	9%
Asia	2,608,000,000	57%
Europe	754,000,000	17%
Latin America	366,000,000	8%
North America	397,000,000	9%

Table 4
Gross National Product

Continent	$ Per Cont.	% Per Cont.	$ Per Capita	% Per Capita
Africa	$ 99 B	3	$ 240	3
Asia	710 B	19	300	4
Europe	1,404 B	38	2,000	23
Latin America	207 B	5	650	8
North America	1,320 B	35	5,500	62

Table 5
Daily Consumption of Animal Protein

Continent	Gm. Per Continent	% Per Continent	Gm. Per Capita	% Per Capita	Servings Per 100 People
Africa	5,690 m	8	14	9	2¼
Asia	15,519 m	23	7	5	6
Europe	24,852 m	36	38	26	9¼
Latin America	7,200 m	11	24	16	3
North America	14,678 m	22	66	44	6

7. After the simulation has been completed, organize students into small discussion groups to formulate generalizations based on their experiences. Assign focus questions from the following list or write your own questions.
   a. Why are some land areas highly cultivated while other only have a small percentage of land under cultivation?
   b. Why do large numbers of people concentrate in some land areas while other areas only have a small percentage of the total population?
   c. Why do you think there are so many starving people in the world when total food production is adequate to provide every person on Earth with an adequate diet? (Student answers may vary.)
   d. Describe your feelings as you participated in this experience (all groups).

Extending the Lesson:

1. Invite representatives from "global action" organizations to visit your class and have them discuss the global population crisis, world hunger, consumption of the world's natural resources and other topics related to this activity. Specifically, you might contact Rosalie Schmitz, Returned Peace Corps Volunteers of Oregon Speakers Bureau, 4106 SE Franklin Street, Portland, OR 97202; (503) 236-8653, or Charlotte Kennedy, The World Affairs Council of Oregon, 1912 SW 6th Avenue, Portland, OR 97201; (503) 229-3049.

2. Have students research data on individual countries for comparison purposes. An interesting comparison to GNP might be that country's debt.

Evaluation: See item #7 in Procedure section.

Topic: **Roots and Nature of Conflict Between Cultures**

Title: **"What Are the Causes of War?"**

Source: Reprinted with minor changes from Approaches for Teaching About the Nuclear Arms Race: A Guide for High School Teachers, Milwaukee Public Schools, Milwaukee, Wisconsin, ©1985, pages WP 2-3, # 2-1. Reprinted with permission.

Essential Learning Skills: 2.2 (d), 3.1 (b,d), 4.2 (a), 7.2 (b,c)

Suggested Grade Levels: 10-12

Suggested Time: 2-3 days

Suggested Course Content: Social studies (U.S. history, world history, global studies, international relations)

Objectives:

A. To examine some common causes of war.
B. To research and compare the causes of specific wars in U.S. and world history to the "common causes of war."
C. To analyze and evaluate the causes of past wars.

Procedure:

1. Distribute a copy of "What are the Causes of War?" to each student. They are first asked to examine Table A, which lists "Some Common Causes of War." Next, by using supplementary materials found in the classroom or by visiting the library, students work in groups of four to discover the causes of the wars listed in Table B. Students are not limited to the causes found in Table A as particular conflicts may require situationally specific answers. Suggested causes to the conflicts listed on Table B are provided on pp. 48-49.

2. Divide up the "Discussion Questions" among the four groups of students. Ask each group to discuss and prepare answers to three of the questions to be shared in a large group discussion.

3. Begin the large group discussion of each of the questions by asking those small groups assigned a particular question to share their ideas. Build the discussion by encouraging others to respond to those ideas.

Extending the Lesson: Have students examine global "hot spots" and identify the cause(s) of each conflict.

Evaluation: Ask students to identify - either orally or in writing - some of the common causes of war and to provide examples of specific wars in history as support.

"What Are The Causes of War?"
Student Handout
Page 1

Over the years of human history the desire to acquire land was to be just one of the causes for war between various societies. Religion, economic needs, political differences, individual human weaknesses, the desire for power over others, and many other causes have led one generation after another to engage in war.

Study Table A which follows. It should help you to understand some of the common causes of war.

Table A "Some Common Causes of War"
Competition for the control of nearby territory for either resources or security.
Desire to control and eventually absorb other people or nations thereby creating an empire.
Desire by a group of oppressed people who have a common culture to throw off the control of another nation.
Fear of the growing power of another nation.
The desire to fight with other nations whose people speak, act and worship differently.
Rivalry over commercial trade; to have a secure market for goods and a reliable source of raw materials.
Desire for revenge over past injuries inflicted by another nation.
The wish to forcibly spread the "correct" system of beliefs or government among the people of a nation to be conquered.
Desire to acquire natural resources or other forms of wealth.

Look at Table B below which provides a list of wars that are studied in world history and United States history. Work in groups of four to identify the causes for each of the wars listed. Once your group has identified the causes for all of the wars on Table B, compare them with those provided in Table A.

Table B
"Some of the Major Wars in History"

In World History	In U.S. History
The Punic Wars	The French and Indian Wars
The Crusades	The American Revolution
The Hundred Years' War	The War of 1812
The Thirty Years' War	The Mexican War
The Seven Years' War	The Civil War
The Napoleonic Wars	The Spanish-American War
The Franco Prussian War	World War I (American involvement)
The Boer War	World War II (American involvement)
World War I	The Korean War
World War II	The Vietnam War

Discussion Questions:

1. What other causes did you discover that could be added to Table A?
2. Have any of the causes listed become obsolete? Why?
3. Are some wars unavoidable? Why?
4. Are some wars meaningless? Are all wars meaningless? Why?
5. Why do historians sometimes conclude that the results of one war often "set the stage" for another war?
6. Can historians disagree over the "true" causes of war? Why?
7. Is there a difference between "going to war" by starting a war, versus "going to war" by fighting back in self defense?

* The causes for the wars listed in Table B are mere "thumbnail sketches" that are intended to refresh the memories of teachers who have not taught world history or United States history for some time. Like all historical interpretations they represent the views of the author and are not to be construed as absolutes.

Table B "Some of the Major Wars in U.S. History"*
The French and Indian Wars: Competition and rivalry between the French and British was projected to overseas territories 1689-1756, as both wished to dominate the resources of North America.
The American Revolution: Inept administration by a monarch produced unpopular legislation which led to revolt.
The War of 1812: Issues of maritime rights and War Hawks' desire for territorial expansion led to war.
The Mexican War: Unrest in a border territory and desire for territory led to war.
The Civil War: The issues of federalism versus local self-government and majority rule versus minority rights, became overheated and were brought to a boil by the election of an executive who seemed to have a firm stand on these issues. The focal point was the issue of slavery.
The Spanish-American War: Influence of the media, sympathy for oppressed people and the desire for colonial expansion made use of a military disaster as a pretext for a declaration of war.
World War I: The issue of freedom of the seas and sympathy for democratic ideology propelled the United States to war.
World War II: Japanese plans to dominate East Asia and the Pacific led them to take a reckless gamble in attacking the United States. Axis treaties then involved Germany and Italy.
Korean War: The incursion of the North Korean (Soviet bloc nation) army into South Korea (with military assistance from Red China) was thwarted by the resolve of the United States and its allies.
Vietnam War: The United States strategy of containment clashed with Soviet and Chinese designs to expand Communist power in Asia.

Table B "Some of the Major Wars in World History"*
The Punic Wars: Rome and Carthage's rivalry for control of the western Mediterranean finally centered on Sicily, which was vital to the security of both. When both tried to take over Sicily, war began. The later Punic Wars occurred because many Romans felt that Rome would not be safe until Carthage was destroyed.
The Crusades: Atrocities by the Seljuk Turks, overpopulation in Western Europe and the hope of re-unifying Christianity started the First Crusade. Later Crusades occurred when the Moslems sought to reconquer the Holy Land.
The Hundred Years War: Conflicts over fishing rights in the North Sea, French aid to the Scots, English agitation in Flanders and dynastic claims of the English king ignited the war.
The Thirty Years War: The polarizing of religious differences and growing nationalism clashed with the Hapsburgs' wish to preserve their empire.
The Seven Years War: The desire for revenge on the part of Austria for Prussia's having started the War of the Austrian Succession, coupled with Britain's desire to maintain a balance of power in Europe, produced a world war.
The Napoleonic Wars: A charismatic leader who promised a new order and progress clashed with traditional monarchs who wanted to uphold the status quo.
The Franco-Prussian War: An able diplomat who wanted a war to create national unity tricked an incapable monarch into declaring war.
The Boer War: The British quest for natural resources led to conflict with Dutch settlers.
World War I: Rivalry between Britain and Germany and animosities between France and Germany caused an unstable situation in Eastern Europe to escalate out of control.
World War II: Charismatic leaders who exploited national discontent attempted to dominate the world, aided by new weapons and communication technologies.

Topic: Global Interdependence: Environmental, Economic, Social

	"Interdependence Web"	**"What's News - Global Links in the Media"**
Source:	Christie Ford Bryant Elementary School Lake Oswego School District Lake Oswego, OR	Reprinted with minor changes from The World Citizen Curriculum, Department of Education, State of Hawaii, RS 85-8654, September 1985
Essential Learning Skills:	1.3 (b,c), 2.1 (d) 3.1 (a,c), 6.2 (b)	1.1 (d), 2.3 (d), 3.1 (a,b,d,e) 6.4 (c), 6.5 (a,b)
Suggested Grade Levels:	4-6	7-12
Suggested Time:	2 one-hour periods	2-3 class periods
Suggested Course Content:	Language arts Social studies	Language arts Social studies

Objectives:

GRADES 4-6

A. To recognize the daily involvement of countries with each other.

GRADES 7-12

A. To analyze a newspaper or magazine to discover the amount and relationship of the global (transnational and foreign) activities reported.
B. To complete a "problem analysis" of a global news article.
C. To draw conclusions about the global situations reported and the impact on students' own lives.
D. To develop maps showing the locations and linkages of the global situations.
E. To analyze the ways in which communication/information media shape student perceptions about the world.

Materials:

GRADES 4-6

Newspapers, magazines, yarn, markers, masking tape, 5" x 8" index cards.

GRADES 7-12

Newspapers, magazines, "What's News? Global Links Through the Media" handout #1, "What's News? Problem Analysis of a News Article" handout #2, Dymaxion map handout.

Procedure:

GRADES 4-6

1. Provide students with newspapers and/or magazines from which to cut out articles that mention interaction between two or more countries (or have students bring in articles from home).

2. Provide students with index cards to notate:
   a. names of countries involved.
   b. 3-4 sentence summary of article.

3. Provide students with index cards on which they are to write in large letters the names of the countries mentioned in the articles, one country per card.

4. When students have completed 2-3 cards on articles, have them bring summary and country cards and sit in a large circle.

5. Pass out country cards so that each student has at least one card taped to his/her chest and so that each country is worn by only one person.

6. Progressing around the group, have each student read aloud one of his/her summary cards. At the end of each summary, extend a piece of yarn between those students whose countries were mentioned in the summaries.

7. At the end of the summary readings, a "web" of yarn should be completed that demonstrates the interdependency/cultural involvement of the world in everyday affairs.

GRADES 7-12

1. Introduce the activity to the class. Provide each student (or group) with a newspaper or magazine and copies of the three handouts listed above in Materials.

   Instruct the students to review the newspaper or magazine and find all the articles dealing with global situations ("global" being a transnational or foreign situation).

   Instruct the students that they need to complete the What's News? Global Links Through the Media handout as they review their newspaper/magazine. They will then display their findings on the Dymaxion map handout.

2. Instruct students to find and choose a single article dealing with a global "problem situation." After selecting an article, the students should complete the What's News? Problem Analysis of a News Article handout.

3. Have students mount the articles on a large world map on the bulletin board, with a string linking the article with the region or nation involved. You might have each student give a brief report on his or her article and indicate how it affects the lives of people in your community.

4. Analyze the information generated by the activity. Select questions from the following list to generate a class discussion:

a. How do the articles you have found demonstrate the increasing interdependence of the world? Why?
b. Which articles affect our community the most? Why?
c. How does the news media shape our views and attitudes about other parts of the world?
d. What if we received no news at all about the rest of the world?
e. How has the news media "shrunk" the size of the world?
f. Does the reporting of global affairs ever show any bias toward one side of an issue? Do you find value judgments or prejudices in any of your articles? What ethical standards do you think those who report the news should be held to?
g. Do we hear and read more about certain regions and nations of the world? Are certain parts of the world reported more regularly? Why?
h. How is global news distributed to us? Who controls the lines of distribution? What jobs are created by the dissemination of international news?
i. Do you feel your local newspaper (or television station) has provided you with adequate coverage of global issues and news of other parts of the world? What other sources in your community might you use to receive current information about global trends and events? (List possible individuals, organizations, communication media, etc.)

Extending the Activity:

GRADES 4-12

1. You may want to contact an individual who is working (or has worked) as an international news correspondent, broadcaster or news media writer to speak to the class about his/her job in bringing us the news.

GRADES 7-12

1. You may have students (individually or as a class) keep an ongoing log of the local newspapers (or a weekly magazine) for an extended period of time. Maps could be posted as articles are compiled or a "clippings" scrapbook might be started, categorizing the articles by subject, the types of events they represent or global regions.

2. Have the students monitor television newscasts for one week. (Or, if the resources are available, record a series of newscasts on video cassette for viewing and discussion in class.) Have the students compare newspaper or magazine coverage and television coverage. Evaluate the uses of news media with the following questions:

a. What kind of view of the world do we get from news media?
b. How do things reported by the news media affect our images or pictures about other parts of the world?
c. If you were in charge of choosing what news was reported on television, would you give more or less time to global issues and events? Why?

Evaluation: GRADES 4-6

1. Discuss the dispersion of the yarn connectors. Which country appears to be linked with the most other countries? Which with the least? Hypothesize as to reasons why this pattern emerged.

GRADES 7-12

1. See item #4 in the Procedure section. Evaluate students on their input during class discussion.

Name of Your News Media Publication: _____

Date of Publication: _____

Part I

Instructions

As you find an article dealing with a global situation (between nations or about foreign nations), complete the following information:

Title of article	Region, nation(s) or cities represented	Subject area: Political, Economic, Environment, Technological Change, etc.

Part II

Use your Dymaxion map to indicate the regions, nations and cities found in your review of the news publication. Circle the area or point on the map corresponding to the articles or advertisements you have found and draw a line from the circle to your community.

Part III

Complete the following questions based on the articles you have personally reviewed.

1. Approximately what percentage (an estimate) of your publication dealt with articles on global situations? _____%

2. What percentage of these articles were about:

   a. Conflict or a global problem? _____%

   b. Cooperation or a global opportunity? _____%

   c. Other? _____%

3. What foreign regions and nations were most frequently reported?

4. Can you describe any linkages or relationships between one article and another? (Are these connections between one event and any others?)

5. What articles affect you and your community the most? Why?

"What's News? Global Links Through the Media"
Problem Analysis of a News Article
Student Handout 2

Name of Your News Media Publication: _____

Date of Publication: _____

Title of Article: _____

Analyze your article and the "problem situation" which it is written about and then complete the following questions:

1. What is this article about? (What is the problem situation?)

2. What regions, nations, organizations, etc., are involved? (Who is being affected?)

3. Has the problem situation occurred before? Where?

4. Is the problem situation that is being reported linked to a larger problem? (Is the problem a "symptom" of a greater problem?) How?

5. Mark the system(s) this problem is related to:

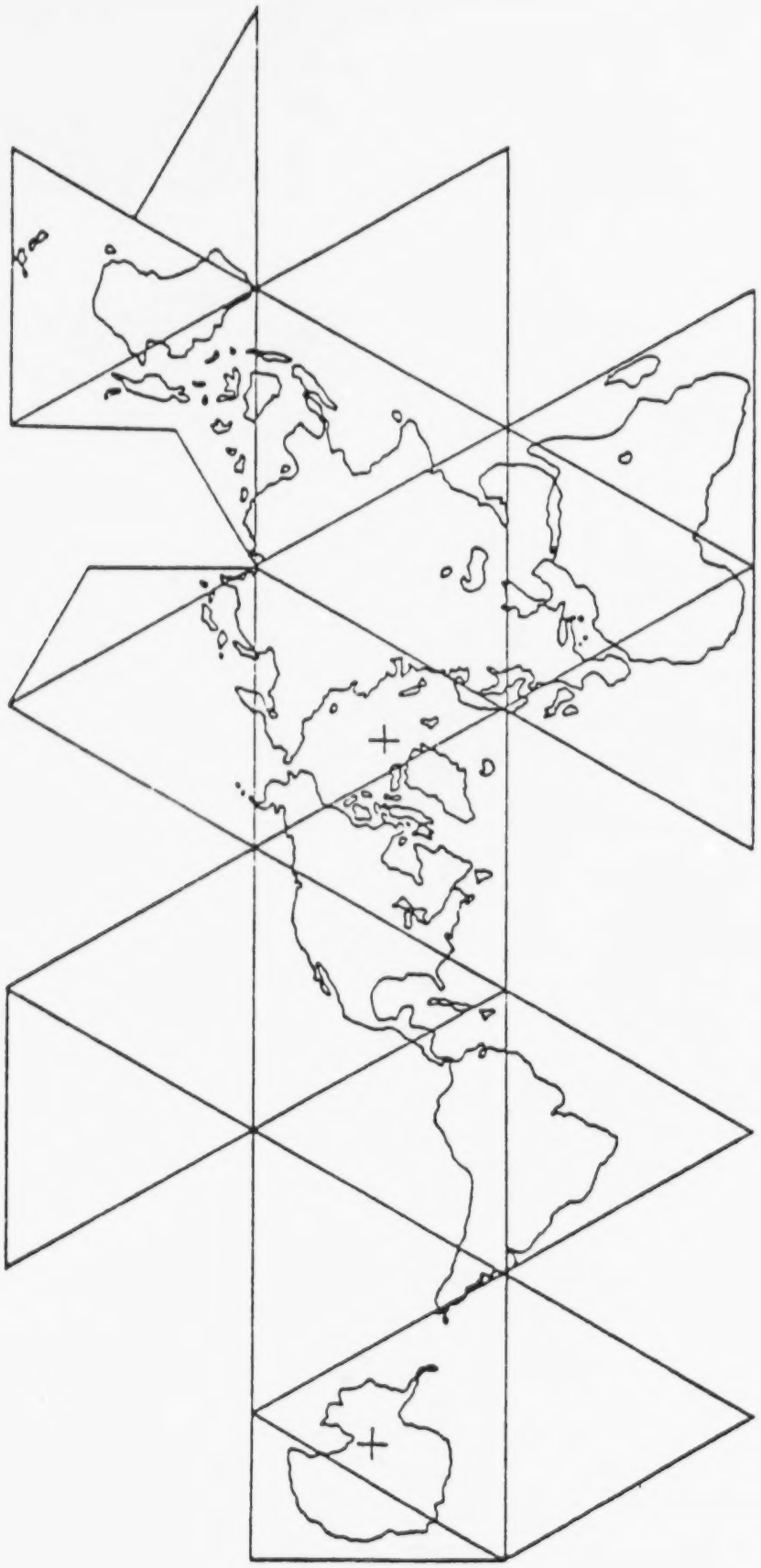
Political _____	Technological _____
Economic _____	Environmental _____
Social _____	Other _____

6. Do you think the problem situation will continue in the future? Why or why not?

7. Does the problem situation affect you presently? Might it affect you in the future? How?

8. How might the problem be resolved? Brainstorm a list of possible solutions.

9. What other information would you like to have about the problem?



Topic: **Global Interdependence: Environmental**

Title **"World in a Jar: A Closed Ecosystem as a Model for the Whole Earth System"**

Source: Adapted from M. Ted Merrill, ©1988.

Essential Learning Skills: 2.1 (e), 3.1 (b, d, c), 4.2 (a), 5.1 (c), 6.1 (a), 6.2 (b), 7.1 (b), 7.3 (d)

Suggested Grade Levels: 5-12

Suggested Time: Preparing the Eco-Jar: 1-2 days
Subsequent observations and discussion: 5-30 minutes per day or week integrated with other courses for a minimum of four weeks.

Suggested Course Content: Science (biology), social studies (global studies, geography), environmental studies

Objectives:

A. To observe the interactions and processes of a small, closed ecosystem.
B. To understand the concepts of ecological interrelatedness and interdependence of organisms.
C. To relate concepts associated with the ecosystem in a jar (interrelatedness and interdependence) to the idea of a whole earth ecosystem in space.
D. To generalize the self-correcting feedback principles of a stable state system.
E. To analyze human activities and values in the context of the earth as a closed ecosystem including: waste disposal/ recycling, resource use, energy sources, population, species extinction, technology and society, development and land use, economics, international relations (grades 8-12).

Procedure:

1. <u>Day 1</u>: Each student (or at a minimum, each team of 3 or 4 students) prepares an ecosystem in a jar using the "How To Make an Eco-Jar" handout. Students in lower grades will need help.

2. <u>Days 2-5 and Weeks 2-4</u>: Each student makes observations and records (daily for the first week, then weekly) visible changes in the Eco-Jars. The jars may be kept indefinitely, but observations over several weeks may be sufficient. If possible, keep and observe Eco-Jars until a stable system is achieved (several months).

   After the basic biological principles of the closed and self-balanced ecosystem (i.e., food chain, recycling waste products) have been grasped by the students, the model can be applied to social studies. Field trips to the city water source, sewage treatment system, and city dump or landfill will show the connection between the Eco-Jar and the earth-scale ecosystem. Questions on subsequent pages suggest use of the Eco-Jar in progressively advanced and more abstract study areas.

Extending the Lesson:

See Item 2. in "Procedure" section for field trip ideas and related discussion questions.

Evaluation: There is no question of "success" or "failure" of the jar itself. There will be gradual changes in appearance of the jar over a few months before it reaches a relatively stable state; at this point it may have a lot of visibly active animals or it may appear lifeless. Either of these results is simply an example of how ecosystems may turn out. Each offers comparable examples on an earth scale and many potential lessons on "Why is it like this?"

Students will be able to:

a. operationally define (for their level) "ecosystem."
b. identify relationships in a typical physical ecosystem.
c. give examples of stable state systems.
d. give examples of how the concepts of interrelatedness and interdependence apply to both the Eco-Jar and the planet Earth.
e. develop an example of a socially stable state including the principle of self-correcting feedback.

Student Handout

HOW TO MAKE AN ECO-JAR

Select a clear glass container which can easily be sealed (not necessarily air-tight, but preferably nearly so). The size is not critical; from a pint to a gallon is a practical range. Smaller than a pint may not give room for a "critical mass" of mutually supportive organisms.

Choose either sea water or fresh water, but do not mix organisms from both. Find a place where an active ecological system is already established: a time pool, swamp, stagnant pond or slough, spring, etc. Places where water is standing or moving slowly are more likely to have an abundance of life forms present and to be functioning in local interdependence.

Dip up some sand or mud and place from a quarter-inch to a one-inch layer in the bottom of your glass jar. Collect one or more types of water plants. Root-type plants that just happen to be temporarily in the water, or which live with their feet in water but are mainly air plants, such as grass or reeds, will not do. Look for free-floating types: "pond scum," hairlike green strands or masses, or more structured kinds like sea lettuce that are regular water inhabitants. Get enough so that it will not pack the jar, but that when floating free without too much crowding will occupy a good portion of the volume of the jar. Put the plants with some water in a separate container for now.

Add enough water to the Eco-Jar to fill it nearly to the top, leaving an inch or two for air space. Add the water carefully so as to avoid too much stirring up of the sediment already placed in the jar. Let the jar stand long enough for the stirred up particles to settle out almost completely. This may take only a few minutes or overnight, depending on the nature of the material and how the water was added.

Now add the plant material you put aside. This green stuff is the engine for the whole jar society since it is what captures energy from the sunlight. (If the plants are added before the mud settles out, they will end up with a layer of sediment that may carry them down and bury them, or at least decrease the amount of light that gets to the green surface.)

By now, you should probably see a variety of little water animals swimming around -- ones that were living on and clinging to the plants. There are undoubtedly others large enough to see but which live their entire lives, or some phases of life, hidden in the sand and mud.

Now add any other small animals, things that you have picked out of the pond or tide pool or swamp: snails, mussels, worms, tiny shrimp, other crustacea, or whatever strikes your fancy. A warning: choose only a few small creatures (up to a quarter of an inch or so). The available oxygen in your little world will be limited, as will food; a creature as large as a crab or a minnow will not only consume himself out of business, but his decaying remains will further tax the available oxygen supply as countless bacteria grow on the luscious carcass.

Put the top of the jar on tightly and set it in the window where it can get direct sunlight. It is probably wise to post a sign saying "Do Not Disturb!" From now on you are strictly a spectator. See how much you can learn from the jar! (See Attachment 3: Background Material)

STUDY GUIDE QUESTIONS AND EXTENSION ACTIVITIES

I. Knowing the Planet Earth: "Thinking About Maps, Places, and the Earth Ball."

1. What is a map?

2. Draw a map of your classroom. Draw a map of your ecosystem.

3. Look on a road map and find the town that you live in and at least two other towns that you have been in. What relationships are represented?

4. If you were in a strange place and did not recognize the things that you saw around you, how might you be able to tell which direction is which?

5. Why is a map of the earth sometimes painted on a ball? How is the ball like an ecosystem?

6. Look at an earth globe map and find the place where you live. If you have ever been far from where you are now, find that place on the globe, too. What relationships are represented? Same or different as in #3?

7. How do we know that the earth is round? List several ways we can tell.

8. Does the picture of the earth taken by the astronauts look like the earth globe in your classroom? What difference/similarities are there?

9. If the earth is an ecosystem, is there one which is larger still?

II. Interrelatedness

A. "<u>Eating And Being Eaten In The Jar</u>"

1. Can you see plants in the jar? Can you see animals in the jar?

2. What can you see in the jar that is neither plant or animal?

3. What do animals eat? Can you think of any food that we eat that is not part of either an animal or a plant? Do plants eat? How do they grow? Why don't you have to feed these pets in the jar like the ones you have at home?

4. How does something rot or decay? What is left behind? What is fertilizer?

5. How do animals breathe? What do they use up when they breathe, and what do they get rid of? Do plants breathe? How is this different from animals? How can the plants and animals in the jar stay alive without air from outside the jar?

6. What is energy? Do plants need energy? Where do they get it? Do animals need energy? Where do they get it?

7. What is the meaning, in biology, of the terms "producers," "consumers," and "decomposers"? Can you identify which is which in the jar?

8. Shut out the light from <u>one</u> of the jars with a dark cover or wrap for three days, then leave it in the light as before. What changes do you see taking place over the next days or weeks? Why? (Do this after the jar has become established in a more or less stable condition.)

B. <u>Recycling</u>

1. What does recycling mean? Does your family recycle anything? Does you family recycle your clothes through the laundry? What things can be recycled instead of throwing them in the garbage can? Do you do this, or do you know anyone who does it?

2. a. Where does your drinking water come from? How did it get there? Take a trip to your city water source and see where it comes from, how it is treated and how it gets from there to your house. If your water does not come from a city water supply, find out where it does come from, and how it gets there.

   b. Where does the water go after you have drunk it or bathed in it? Take a trip to your city sewage treatment plant and see what happens there, and where the water goes from there.

   c. Is your drinking water recycled? What evidence can you site from your knowledge of water and of the earth as a ball in space?

3. What all is recycled in your jar? Compare this with the earth. Are there any resources available to us from outside the earth-ball?

III. Interdependence

1. Who feeds whom in the jar? Give examples of the same thing happening in the world system.

2. Collect five containers or wrappers from different foods that you eat, and from the labels find out where each food or each ingredient comes from. Locate these places on a world globe. What are five major food imports of the United States? Find their sources on the globe. Why do some countries have to import food from other countries?

3. What are the sources of oxygen in the air that we breathe? How does the oxygen get distributed? How long did it take from the eruption of Mt. St. Helens until the ash carried east by the wind begin to settle out of the air on the Pacific coast?

4. What is the meaning of each of these sayings:

   a. Nothing can be created nor destroyed, but only changed to a different form.

   b. There is no such thing as throwing something away.

   c. Everything is connected to everything else.

   d. There is no such thing as a free lunch.

5. Is the Eco-Jar a model for competition or cooperation?

ECOSYSTEM BACKGROUND MATERIAL

In understanding ecosystems, often the best place to start is in the middle of the food chain. At the center you will find organisms that are examples of primary macroconsumers or herbivores (plant eaters). They get their energy or food from producers or organisms that can make their own food as they grow. Found at the bottom of the food chain, these organisms are mostly green plants and some kinds of bacteria. A top level consists of secondary macroconsumers which eat other consumers. While these animals are generally thought of as carnivores, some of them will also eat plants and are therefore called omnivores. When these animals die, their remains decompose (the work of microconsumers) to provide the nutrients needed by plants to continue to grow and complete the circle of the system.

When one animal eats another animal or plant, there is a transfer in nonliving and living materials. The living materials are important because they are the direct source of energy in the system. Plants are responsible for collecting and stabilizing this energy because they are the ones that can use it to make food. This is why they are called the producers. By eating the producers or each other, the consumers (at various levels) then transfer that energy from one organism to another. This system of transfers is called the food chain and it can be traced in any closed system such as the Eco-Jar. The use and transfer of energy also produces heat which should be observerable in the jar. This heat represents the amount of energy lost to the system in every cycle, because the living things in the jar cannot make use of it in their own growth.

Just as the soil and the water play a part in the recycling of energy in an ecosystem, so does the atmosphere. Plants (producers) release oxygen as a product of their food producing process. This is the gas the animals (consumers) need to live. As animals use food for energy, they in turn release carbon dioxide which is the gas plants need to live.

Two other concepts affect ecosystems: diversity and limits. Diversity helps ecosystems become more stable because with it comes more flexibility in coping with adverse conditions such as loss of nutrients, predators, and climate changes. Diversity insures that there are a variety of representatives at every level of the system and thus insures that the system can maintain its recycling ability. The condition for life which is most deficient in the environment of an ecosystem is called the limiting factor. Thus if water and food are in great abundance but there is not the right atmosphere (gases in the air), the system will fail to survive. If the Eco-Jar produces an apparently "dead" habitat, an interesting activity would be to determine what the critical limiting factor was.

Because they are so complex in their relationships, ecosystems are interesting to observe, examine, and diagram. Because they need to be viewed as parts and wholes simultaneously, they demand the best inductive and deductive thinking in ourselves and our students. In creating, observing and reporting on the development of your Eco-Jar, remember three things:

- -- Ecosystems provide for an efficient one-way flow of energy through themselves;
- -- Ecosystems recycle the chemicals needed to produce that energy in the first place; and,
- -- Ecosystems, if left alone, will continue to exist as long as there is a source of energy like the sun.

For a more detailed discussion see Christensen, John W., Global Science: Energy, Resources, Environment, Kendall/Hunt, Dubuque, Iowa, 1984.

Topic: **Contact with Different Communities and Culture Groups**

Title: **"Learning Something New"**

Source: Adapted from The World Citizen Curriculum, Department of Education, State of Hawaii, RS85-8654, September 1985.

Essential Learning Skills: 2.3 (c,d); 5.5 (c)

Suggested Grade Levels: 7-12 (adaptable to grades 3-6)

Suggested Time: 1-2 class periods

Suggested Course Content: English language arts, speech, global studies, foreign language

Objectives:
A. To formulate appropriate questions for foreign visitors.
B. To evaluate cross-cultural experiences.

Procedure:

Preparation: Identify individuals from foreign countries willing to visit your class. Schedule a time that is mutually convenient for your foreign guests to visit. You should have 3-6 guests from different cultural backgrounds.

Activity: Have students individually prepare a list of questions they want to ask the guests about their homes, nations, and cultures. Possible areas for questions: home, community, meals, political system, holidays, geography, climate, dress, customs, sports, recreation, dating, marriage, and the guests' expectations before arriving in the U.S.A.

When your guests arrive, arrange them in a panel and ask for a brief presentation describing why he or she is now in the United States. Then allow students to ask their questions.

Next, divide the class into equal numbers, one group per visitor. The students should use this time to further interview the guests and develop more contact.

After the guests have departed, allow time for students to share their experiences.

1. What new things did you learn?
2. How does life in the U.S. compare with life in our visitors' countries?
3. How easy was communication?
4. What kind of relations does the United States have with our visitors' countries? Given what you have learned today, can you explain why?

Extending the Lesson:

Ask students if they would like, given the opportunity, to participate in an exchange program. Have students write to organizations which sponsor exchange students and investigate the opportunities for U.S. students to travel abroad.

Evaluation: Critique the interviews and evaluate responses to questions in the final activity in the Procedure section.

Topic: **Contact With Different Communities and Culture Groups**

Title: **"Global Pen Pals"**

Source: Reprinted with minor changes from The World Citizen Curriculum, Dept. of Education, State of Hawaii, RS 85-8654, September 1985.

Essential Learning Skills: 5.1 (a), 5.3 (a,b), 5.4 (d), 5.6 (a,d,e), 5.7 (a)

Suggested grade levels: 5-12 (adaptable to grades 2-4)

Suggested time: Varies; should be ongoing

Suggested course content: Social studies (global studies), English language arts, (composition), foreign language

Objectives:
A. To develop cross-cultural communication skills.
B. To increase student understanding of global geography.
C. To develop an increased awareness and interest in the diverse people, cultures and values of other countries.
D. To develop skills in letter writing and interpersonal correspondence.

Materials: Addresses for pen pals in foreign countries (see item #1 in Procedure section for more information on obtaining addresses), examples of proper letter and address forms, supply of aerograms, writing pens.

Procedure:

1. If possible, allow the class, individually or as a whole, the opportunity to exercise choice in selecting a foreign country or region. A central pen pal "clearinghouse" which is one source of pen pal names and addresses is the Afro-Asian Pen Pal Center, C.P.O. Box 871, Kingston, New York 12401.*

   Another way to generate pen pals is by utilizing community resource people as liaisons to establish foreign links. It may take some initiative on your part, but links can be established through friends, relatives or family members of the students, who have lived or traveled abroad; foreign students or faculty; international organizations with branches in your community; and study abroad programs. Describe to these people the type of contact and exchange you would like to make and ask them to initiate communication with a school(s) in the appropriate foreign location. In this way, you can also start a "sister school" pen pal relationship.

   * Note: There is a small charge (under $1.00 per student) for ordering pen pal addresses from the Afro-Asian Pen Pal Center. Additionally, each student correspondence will require a nominal aerogram cost. Unless your school is

able to absorb these expenses or alternative funds (parents, community/business contributions, fundraiser) become available, make participation in the activity optional.

2. Introduce the pen pal program to students. Have the students choose a foreign country, school or individual from the list of names and addresses you have accumulated.

3. Provide an opportunity for students to do background research on the foreign country and region they will be communicating with. Gather some appropriate resources: encyclopedias with information about particular countries; National Geographic and travel magazines; brochures and maps. Ask the students:
   a. What do you want to discover about your pen pals?
   b. What might they want to learn about you?

4. Distribute a copy of the "Tips for Good Letter Writing" handout to each student. Review and discuss the tips with students before they write their letters. Ask them to make lists of what they might include in their letters.

   Using a chalk board, overhead projector or bulletin board, provide students with a sample letter and addressed envelope demonstrating an appropriate form.

5. Have students write a first draft letter to their pen pals, using a pencil on lined paper. Collect these letters and assist them in correcting format, spelling, etc.

6. Return the corrected letters to the class and distribute aerograms to each student. (Aerograms are less expensive than postage for a regular letter. Aerograms are available from any post office.) Have the students rewrite their corrected letters on the aerogram using a pen. Students should also address the envelope, checking the address.

7. Collect and double-check the student letters for format, address accuracy and legibility. Mail the letters.

8. As students receive replies, ask them to share the letters with the class. Discuss the similarities and differences between the foreign persons' lifestyles and that of the students. Create a world map display to indicate the locations of pen pals, and ask students for permission to post their pen pal letters on the bulletin board.

Extending the Lesson: Further develop the "sister school" concept by making an audio-tape, sending a class photograph, postcards or other audio or visual materials to describe your class and culture.

Evaluation: See item 8 in Procedure section.

Student Handout

TIPS FOR GOOD LETTER WRITING

I. How to Write

1. Write neatly and clearly, especially the address of your pen pal because postal services in some areas are not familiar with Romanized letters.
2. Keep in mind that your penfriends will probably be reading a language foreign to them.
3. Do not use abbreviations except for "Mr." or "Mrs." on the address.
4. State whether you are male or female because in many cases feminine and masculine names are not recognized in another culture.
5. If writing to Far East countries the family name is first, followed by the first names.
6. Be certain to enclose your return address on both envelope and letter.
7. Use "Mr.," "Miss," or "Mrs." on envelope address as a sign of respect.
8. Avoid slang expressions as these have only local understanding.
9. Keep material exchanges mutual. Avoid sending valuable items or anything you want returned.

II. Things to Write About

1. Write about your physical self and, if possible, enclose a photo.
2. Describe your home, neighborhood, school and community.
3. Describe your school calendars and hours, as well as extracurricular activities.
4. Sports have a universal appeal to almost everyone.
5. Mention your goals and aspirations (what you want to be and do in the future).
6. Describe how you spend your free time and weekends, including hobbies and personal interests.
7. Write about your vacations, places you have visited, both within and outside the United States.
8. Mention what school subjects you are taking and which you like best.
9. State how it feels to meet people outside your culture and how you hope this friendship grows.
10. Describe your local climate and seasons. Since these vary from place to place, even a common activity like swimming all year around may be something unique and unusual to people in cold climates.
11. Everyone eats, so write about what you typically have during an average meal.
12. If you work, write about your job.
13. Mention what your father and mother do for a living and, if you have brothers and sisters, tell how old they are and how they fit into the family.
14. Almost everyone has a pet or likes pets so tell about yours and about its care.
15. Holidays and celebrations are common to every culture. Tell about yours and what you do.
16. Ask lots of questions. This is your chance to learn something about this individual and his or her way of life.

Remember, no one in the world is like you. You are a unique and interesting person and you have a great deal to share. Each letter you write contains a little of you in it. Make it warm and sincere and make your new friend feel comfortable knowing you.

RUSSIAN ALPHABET

Printed		Pronunciation	Printed		Pronunciation
А	а	ah	З	з	zeh
Б	б	bdh	И	и	ee
В	в	veh	Й	й	oy
Г	г	gheh	К	к	kah
Д	д	deh	Л	л	el
Е	е	yeh	М	м	em
Ё	ё	yo	Н	н	en
Ж	ж	zheh	О	о	o

RUSSIAN ALPHABET

Printed		Pronunciation	Printed		Pronunciation
П	п	peh	Ч	ч	cheh
Р	р	err	Ш	ш	shah
С	с	ess	Щ	щ	shcha
Т	т	teh	Ъ		
У	у	oo	Ы	ы	ih
Ф	ф	ef	Ь	ь	
Х	х	hah	Э	э	eh
Ц	ц	tseh	Ю	ю	u
			Я	я	ya

English Numbers	Russian Numbers
one	один
two	два
three	три
four	четыре
five	пять
six	шесть
seven	семь
eight	восемь
nine	девять
ten	десять

Дорогие друзья!

Dear Friends!

здравствуйте!

Hello!

Привет из Америки!

Greetings from America!

Меня зовут _____.

My name is _____.

В моей семье _____ человек.

My family has ___ people.

у меня есть

I have

у него есть

He has

у нее есть

She has

у нас есть

We have

Мне _____лет.

I am ___years old.

я живу

I live

в доме

in a house

в квартире

in an apartment

в городе _____

in the city of _____

в штате _____

in the state of _____

Как Вас зовут?

What is your name?

кошка

a cat

сооака

a dog

сколько вам лет?

How old are you?

Его зовут _____.

His name is _____.

Ее зовут _____.

Her name is _____.

орат

a brother

сестра

a sister

Ему _____лет.

He is ____ years old.

Ей _____ лет.

She is _____ years old.

Моя мать

My mother is

Мой отец
My father is

Мой брат
My brother is

Моя сестра
My sister is

учитель
a teacher

студент
a college student

инженер
an engineer

рабочий
a worker

музыкант
a musician

врач
a doctor

медсестра
a nurse

продавец
a salesclerk

управляющий
a manager

адвокат
a lawyer

домашняя хозяйка
a homemaker

Я люблю
I like

Я играю
I play

в шахматы
chess

в теннис
tennis

в футбол
soccer

в воллейбол
volleyball

в баскетбол
basketball

в хоккей
hockey

на скрипке
the violin

на рояле
the piano

на флейте
the flute

читать
to read

80

смотреть телевизор
to watch television

слушать музыку
to listen to music

танцевать
to dance

плавать
to swim

бегать
to run

петь
to sing

кататься на лыжах
to ski

кататься на коньках
to ice skate

писать
to write

заниматься
to study

спать
to sleep

есть
to eat

слушать пластинки
to play records

Я собираю
I collect

марки
stamps

книги
books

пластинки
records

фотографии
photographs

в нашем штате есть
Our state has

гора
a mountain

лес
a forest

озеро
a lake

река
a river

For additional phrases contact THE PAIRING PROJECT, PO Box 19049, Portland, OR 97219 (503) 245-3519

Topic: **Community Service (and Cultural Awareness)**

Title: **"Bridging the Gap Between Them and Us"**

Source: Adapted by Guy G. Hill, Franklin High School (Portland Public Schools), 5405 SE Woodward Street, Portland, OR 97212 from the Family Home Evening Resource Book (Salt Lake City: The Church of Jesus Christ of Latter-Day Saints, ©1983). Used with permission. Ideas for "Extending the Lesson" developed by Marjorie Covey, Marion ESD, Salem, OR.

Essential Learning Skills: 3.1 (b); 5.1 (e)

Suggested Grade Levels: 2-8

Suggested Time: 2 days, 45 minutes each day

Suggested Course Content: Social studies, guidance and counseling

Objectives:

A. To analyze and compare different points of view.
B. To experience the feeling of being different from others.
C. To develop respect for others who are different and who hold different points of view.
D. To increase understanding of those who are different, through a service project.

Materials: Bag of peanut M and M's; blindfold and cotton earplugs for various members of the class, gloves, mittens, or socks to cover students' hands.

Procedure: Day 1: Pass out M and M's. (Everyone will want three or four.)

1. Explain that the M and M's are like people. Have the class describe how the M and M's look (i.e., color, size, shape).
   ASK: Do people look like this? (Point out that people come in different sizes, shapes, colors, etc.)

2. Have students gently suck off the colored layer.
   ASK: What comes next? (the white, hard shell)
   ASK: What purpose does this shell serve? (This is the protective layer -- it holds the candy together)
   ASK: Do people have protective shells or defense systems? List some of them. (Being shy, offensive, boisterous, withdrawn, etc., -- anything that stops us from expressing how we feel inside.)
   Point out that everyone seems to have these protective shields, even if they are well-adjusted.

3. Have students tell what comes next on an M and M. (the chocolate)
   ASK: Do people have chocolate, gooey stuff? (yes)
   What does this stuff represent? (All the things people tell you about yourself that you accept; i.e., "You're pretty." "You're stupid, lazy, smart, fat, uncoordinated." etc.)

4. ASK: What comes next on the M and M? (the nut)
   Point out that the center of every person is the same thing. (the nut) Students will laugh. Then, go on to explain that even though on the outside we are different and we don't all think the same, inside we all have the same basic needs (i.e., food, warmth, shelter, and the desire to be loved and accepted).

Understanding How It Feels to be Different

1. Have two or three students come forth and blindfold them. Ask them to do some simple task like go get a book off the shelf, or write their name on the blackboard, etc. Let students explain how they felt afterwards while they were performing their tasks.

2. Have two or three other students put on mittens. Then ask them to tie their shoes or button a shirt, etc.
   ASK: How did you feel to find a rather simple task made hard to do, and what were your feelings when you were able to accomplish the task?
   Point out that sometimes relatively simple tasks can be made difficult for those with special problems or handicaps.

3. Now have other students come forth and use the cotton earplugs to impede their hearing. Give some brief command (i.e., "Go to the door.") Do this when the students can't read your lips or are facing another direction. If they don't respond, repeat the command but this time get their attention and face them so they can read your lips.
   ASK: What have you learned about communicating with deaf people or those who are hard of hearing?

4. Now, have your students pretend that they have moved into the neighborhood from another country. They might have a different color of skin. Their customs might be different. They might be accustomed to eating different foods. Everyone speaks a different language than their own. To help students assimilate this experience, read a few sentences from the different languages below and then ask what you said. Don't worry about pronunciation since they won't understand. If you have bilingual students or adults in the school, have them say the following in other-than-English.

English

We are happy to see you. Please stand and tell us your name. Where do you live? You may sit down.

Spanish

Estamos agradecido de verlo. Ponga a pie y diganos su nombre. Donde vive usted? Toma asiento.

German

Wir freuen uns, Sie zu sehen. Bitte stehen Sie auf, und sagen Sie uns wie Sie hei en. Wo wohnen Sie? Setzen Sie sich bitte.

French

Nous sommes heureux de vous voir. Levez-vous, s'il vous plait. Comment vous appelez-vous? D'ou venez-vous? Asseyez-vous s'il vous plait.

Treating People Who Are Different With Respect and Understanding

1. Have the students express problems they have seen among people who are different. Let students suggest ways to show more understanding toward these people. Challenge the students to identify circumstances in their school where they can practice more understanding and respect for these people. Ask if anyone has had an experience where they have given respect or understanding to these types of people. Close by letting each student think of some person they could help in a special way.

Day 2:

1. Have students brainstorm, select and plan a special project to learn understanding through service. The project should directly involve students with individuals or groups who are different (i.e., handicapped, elderly, various ethnic groups, preschool children). The group could select a certain project within the school, or projects could actually go out into the community.

Extending the Lesson:

Illusions: Create two arcs of the same size and shape. Space one arc above the other. The illusion will make the bottom arc appear larger.
ASK: Which arc appears bigger? (The bottom)
Now, switch the positions of the arcs and ask the same question. Finally, put the arcs together so both match up exactly. Explain that people don't always see things the same way. Many times we need to be tolerant and more understanding of people and the circumstances they are in.

The same illusion can be created with the rabbit/duck picture and the vase/two-people picture. There are many pictures that can help teach this concept. Discuss what the students think they see, what they believe is real, and the explanation for the distortions.

Tie the examples once again to the major theme of understanding and compassion.

Interviews: Have students interview others to see if their observations and points of view are the same or different from their own.

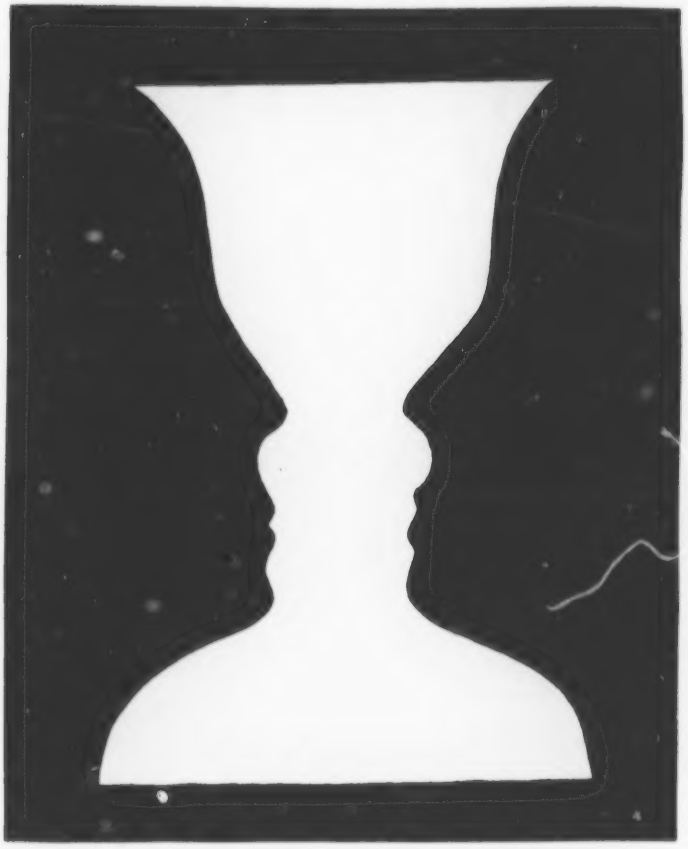
a. The cook's (or lunch server's) view of cafeteria behavior compared to a student's
b. A teacher's view of noon recess on the playground compared to the principal's, a student's
c. A grandparent's view of student learning compared to their own, their parent's, their teacher's
d. A bus driver's view of student behavior compared to their own
e. Evaluation of a sports game by the officials, by the players on the opposing team, by the spectators, by the coaches

Discuss results of the interviews and why there are similarities and differences in viewpoints.

Evaluation: Upon completion of the service project, have students discuss:

a. What feelings did your companion(s) demonstrate that you shared? (happiness, laughter, sadness, etc.)
b. What things did you both like? dislike?
c. In what ways was your companion like you? different from you?

Have students summarize -- orally or written, individually or as a group -- what they found out about the basic similarities of people.



87

UNIT 2 LESSONS

EXAMINING PROCESSES AND SKILL DEVELOPMENT

Identifying Attitudes and Attitude Formation Processes--
"Super Detective" 89
Problem Solving--
"Learning and Using Problem Solving Strategies" 91
Critical Thinking--
"Fact or Opinion?" 93
Decision Making--
"Ex Comm and the Cuban Missile Crises" 99

UNIT 2: EXAMINING PROCESSES AND SKILL DEVELOPMENT

How do young people learn to think for themselves? How do they learn to reason, make decisions and form personal attitudes toward life? Schools can play a major role in helping students develop courage, imagination, ethics and independent thinking.

Unit 2 is one of the broadest in the nuclear age education curriculum. Activities outlined in this unit are designed to engage and stimulate in students a variety of important personal skills, including critical thinking, creative problem solving and recognition of biases and how attitudes are formed. These lessons involve students in practicing accuracy, logic, honesty, imagination and care. Students are asked, "What do you think?" "Why do you think so?" and "How did you come to think this way?" They will gain valuable experience in analyzing various positions and describing how those positions were arrived at. Lessons in reasoning may encompass narrow sequences of ideas, as well as complex systems of logic; attitudes examined may range from small, specific opinions to fundamental beliefs about the world. The lessons are not designed to impose attitudes upon students, but to enhance their abilities to decide for themselves.

A principal objective of the lessons in Unit 2 is to help students develop personal independence by practicing important skills in reasoning. Life in the nuclear age calls for citizens with the competence and confidence to analyze, consider, debate and suggest new ideas.

Children learn important thinking skills and form viewpoints with help from many sources, including the models provided by teachers and other students, as well as what they read, write, discuss and ponder. Many of these skills could be practiced as a part of nearly any lesson, from the earliest grades. Thus, teachers of many grades and subject areas may make use of the examples in this unit.

Teachers of these subject areas may consider the following topics and activities as ways to implement the goals of Unit 2:

Mathematics: logical processes and progressions; conceptualizing extremes in magnitude.
Social studies: biographies; how people and societies of the past made decisions or solved problems; attitudes that affected history and how they were formed; alternative solutions to historical problems; philosophy and ethics; interviews.
Science: scientific method; research skills; lab procedures and reports;
Computer science: sequences, matrices, programming.
English language arts: communication of thoughts and attitudes in speech and writing; analytical reading, linguistic structure; reasoning and emotion.
Arts: expressions of personal ideas and feelings; appreciation of others' ideas and feelings; methods of organization; establishing priorities.
Health: making decisions; recognizing and coping with peer pressure; psychology and mental health.
Foreign language: attitudes and assumptions of other cultures; differences in thinking reflected in language.
School activities: decision-making processes as a part of student government, school newspaper, honor society and clubs; decision-making processes in committees (school board, administration, parents, faculty and students), as well as implementation of decisions and recognition of leadership.

Topic: Identifying Attitudes and Attitude Formation Processes

Title: "Super Detective"

Source: Adapted from "Social Studies Basic Skills Connection," Missouri Department of Elementary and Secondary Education.

Essential Learning Skills: 6.3 (d), 6.4 (a) (c), 6.5 (b)

Suggested Grade Level: 3-5

Suggested Tim: 30 to 60 minutes

Suggested Course Content: English language arts, social studies, visual arts

Objectives:
A. To help students develop the ability to detect the objective(s) of a writer or speaker who is trying to persuade.
B. To have the students develop a description of persuasive techniques used.
C. To help students evaluate the logic of what they hear or read.

Procedures:
1. Teacher and/or students bring to class examples of TV commercials (videotaped examples will allow for several class viewings during analysis), newspaper or magazine advertising.

2. View or read a particular advertisement. Ask the students to consider the following questions:
   a. Who is doing the talking? Is the person "real" or "made-up (i.e., acting the role of a consumer, worker, etc.)
   b. How are we supposed to feel about this person? Favorable of unfavorable? Would we like to be this person? How do we know this?
   c. Who is the advertisement addressing? Children, adults, senior citizens, a particular economic or social group, etc.? How do we know this (evidence)?
   d. What is the main thing that the advertiser wants us to believe?
   e. Are the advertisers appealing to some particular emotion (fear, happiness, etc.), desire (prestige, wealth, etc. or need (safety, love, acceptance)?
   f. How could we determine if the speaker or writer is telling the truth?
3. Repeat this procedure with several different forms and kinds of advertising.

4. Assist the students in identifying or classifying different techniques they have observed being used by advertisers.

Note: This activity could be applied to any persuasion effort (e.g., political elections, speeches).

Extended Activities:

Have students develop an advertisement to persuade individuals to a particular action. Class can critique these projects using the classification system they developed in the previous activity.

Apply the same techniques to visual forms. Are there unique qualities in visual arts that they did or did not observe in written or spoken advertisements? How do words and visual images work together to create a stronger persuasive presentation?

Evaluation: Can students identify a variety of strategies used in persuasive advertising?

Students should have their own system for classifying these kinds of advertising. (Note: teacher may wish to provide a system of classification for the students' use to compare and contrast the categories they developed.)

Topic: **Problem Solving**

Title: **"Learning and Using Problem Solving Strategies"**

Source: Adapted from material in Practical Strategies For The Teaching Of Thinking, Barry K. Beyer, Allyn and Bacon, Inc. Boston, 1987.[1]

Essential Learning Skills: 6.3 (a) (b) (c) (f)

Suggested Grade Levels: 5-12

Time Required: 3 days plus extended practice

Objectives:
A. Teach students a systematic strategy for examining and solving problems.
B. Provide students with opportunities to solve problems using the model.

Materials needed: Handout of a problem solving model

Procedure: **Day One:** Teacher should address the need and benefit of solving problems through the use of a systematic approach (i.e., better or more thoughtful solutions, fewer "false starts," etc.). Teacher should also discuss the general applicability of the model to a variety of problems.

Introduce the steps to a problem solving model and discuss the importance and planning needed for each.

1. **Identifying a problem**
   Picking out problem statement or finding problematic condition in given data or a situation.
   Identifying the elements of the desired state (goal), the present state, and any obstacles between the two.
   Identifying controversy or obstacle-producing elements.
   Identifying primary and secondary problems.
2. **Presenting (clarifying) the problem**
   Defining key terms and conditions.
   Identifying key elements: goals, operations, knowns, unknowns.
   Putting elements of problem into own words or symbols (via pictures, diagrams, numbers, and so on).
3. **Choosing a solution plan**
   Restating the problem to be resolved.
   Selecting a plan appropriate to the type of problem perceived, from such plans as:
   - -trial and error
   - -multi-dimensional matrices
   - -hypothesis making and testing
   - -specific formulas
   - -turning the problem into auxiliary or subordinate problems
   - -working backward from imagined solutions
   - -working analogous problems
   - -anticipating and planning for obstacles.

[1]This is one of many problem solving models. Schools are encouraged to adopt a single model for use in all classes so that students do not become confused by differing terminology.

4. **Carrying out the solution plan**
   Monitoring the process.
   Removing obstacles.
   Adapting procedures.

5. **Concluding**
   Stating the findings.
   Providing supporting evidence and reasoning.

6. **Evaluating (checking)**
   Validating the findings in terms of goals and procedures.
   Validating the procedures and overall process in terms of efficiency and effectiveness.

Day Two: Conduct a guided practice activity with students. Ask students to identify a relatively common problem (i.e., related to friends, school, home, etc.). Ask students to use the procedures outlined in the model to solve the problem. Keep a record of their discussion and conclusions on the board. Review the entire procedure at the conclusion.

Day Three: Ask students to individually select a problem (or the teacher may want to identify a problem) and have students work through the process individually in writing. Discuss strategies and solutions, particularly focusing on unique or individual uses of the model to identify, plan and solve the problem.

Extended Activities:

The purpose of this lesson is to give students a set of common language and strategies for viewing and solving a variety of problems. It is important to provide multiple opportunities to use the model in the classroom situation and to encourage students to use the model in situations outside the classroom. Strategies for doing this might include:

1. A challenge-of-the-week activity. Teacher gives individuals or teams different problems to solve.
2. Application of the model in different subject areas.
3. Periodic writing assignments focusing on recent use of the problem solving strategies.

Evaluation:

1. Students should be able to identify and define the components of the model.
2. Students should be able to apply the model to a variety of classroom and non-classroom problems.

Topic: Critical Thinking

Title: "Fact or Opinion?"

Source: Mastering Reading Through Reasoning, Dr. Arthur Whimbey, Innovative Sciences, Inc., Stamford, Connecticut, 1985.

Suggested Grade Levels: 6-12

Suggested Time: One day

Suggested Course Content: Language arts, social studies, other

Objective: Students will be able to distinguish between statements of fact and opinion and write an explanation of why a given statement is a fact or opinion.

Procedures:

1. Teacher begins with a discussion of the difference between a fact and an opinion. Examples should indicate that a key criteria is that FACTS can be measured, substantiated or otherwise be viewed as descriptions about which there is general agreement in any circumstance. Conversely, OPINIONS are based on judgments and individual perceptions. For example, "Bill is very short" is an opinion while "Bill is five feet tall," is a fact.
2. Distribute fact or opinion handouts. Review examples as guided practice.
3. Students complete remaining exercises individually.
4. Review and critique answers and explanations as a class.

Extensions:

1. Ask students to develop statements that can be viewed as fact or opinion.
2. Have students read a selection of articles that present a mixture of fact and opinion. Have them critique each article to determine if the main idea is validated by the use of facts and opinions.

Evaluations: Students should be able to distinguish fact from opinion and give a reason for their answer.

In the space labelled EXPLANATION, write one or two sentences explaining your answer. If you said the statement is an *opinion*, explain which word or words give a judgement on which people might disagree. If you answered *fact*, explain which word or words present a clear description that is definitely true.

Try the following example. Write your answers before checking the ones given below.

EXAMPLE 1: I have the toughest math teacher in the school.

FACT OR OPINION: _____

EXPLANATION: _____

_____

_____

Answers: **Here is how you could have answered this exercise. (The exact words you used to give your explanation may be different from those here, but should state the same ideas.)**

FACT OR OPINION: opinion

EXPLANATION: "Toughest in the school" is a judgement. Some students may disagree with that and feel their own math teacher is tougher.

Now try the next example.

EXAMPLE 2: My math teacher gives a quiz every Friday.

FACT OR OPINION: _____

EXPLANATION: _____

_____

_____

Check your answers against those on the next page. Again, the exact words you used to give your explanation may be different from those shown. Make sure, though, that they state the same ideas.

Answers: FACT OR OPINION: fact

EXPLANATION: "A quiz every Friday" states a definite fact.

When you read this statement, you should have noted that it did not give a judgement. Rather, it gave a clear description of something definitely true. Now try the exercises.

EXERCISE 1

This cup of tea is too sweet.

FACT OR OPINION: _____

EXPLANATION: _____

_____

EXERCISE 2

This cup of tea has five teaspoons of sugar in it.

FACT OR OPINION: _____

EXPLANATION: _____

_____

EXERCISE 3

The temperature in St. Louis today is 85°.

FACT OR OPINION: _____

EXPLANATION: _____

_____

EXERCISE 4

It is uncomfortably hot in St. Louis today.

FACT OR OPINION: _____

EXPLANATION: _____

_____

EXERCISE 5

This is a 15-watt light bulb.

FACT OR OPINION: _____

EXPLANATION: _____

_____

_____

EXERCISE 6

This is a very dim light bulb.

FACT OR OPINION: _____

EXPLANATION: _____

_____

_____

EXERCISE 7

The military action has been successful.

FACT OR OPINION: _____

EXPLANATION: _____

_____

_____

EXERCISE 8

The president of the enemy country surrendered.

FACT OR OPINION: _____

EXPLANATION: _____

_____

_____

EXERCISE 9

I have the prettiest dress at the party.

FACT OR OPINION: _____

EXPLANATION: _____

_____

97

EXERCISE 10

That woman is a professional photographer.

FACT OR OPINION: _____

EXPLANATION: _____

_____

_____

EXERCISE 11

That woman is a highly talented photographer.

FACT OR OPINION: _____

EXPLANATION: _____

_____

_____

EXERCISE 12

Art owns a fast car.

FACT OR OPINION: _____

EXPLANATION: _____

_____

_____

EXERCISE 13

The Grand Canyon is the most awesome sight on earth.

FACT OR OPINION: _____

EXPLANATION: _____

_____

_____

EXERCISE 14

In land size, Europe is the smallest continent.

FACT OR OPINION: _____

EXPLANATION: _____

_____

Topic: Decision Making

Title: "Ex Comm and the Cuban Missile Crisis"

Source: Reprinted with minor changes from American History and National Security: Supplementary Lessons for High School Courses, The Mershon Center, The Ohio State University, Columbus, OH, ©1987, pp. 194-199. Reprinted with permission.

Essential Learning Skills: 2.3 (c), 3.1 (b), 6.1 (a), 6.4 (c,d)

Suggested Grade Levels: 8-12

Suggested Time: 2 days (including homework)

Suggested Course Content: Social studies (U.S. history)

Objectives:

A. To identify the nature of the Cuban Missile Crisis.
B. To identify and explain the various options facing the President.
C. To analyze the way in which the President made his decision.
D. To evaluate the decision-making process in this crisis.

Procedure:

1. Present the class with the following scenario. You are President of the United States. The Director of the CIA brings word that an aggressive nation has been placing offensive weapons in a small country near your borders. These offensive weapons are not yet in place or operational, but within a matter of weeks they may be. The purpose of the aggressive nation is not clear, but it could plan to use these weapons as a threat to the United States, or as some form of blackmail: to make the United States back down somewhere else on the globe. So far, the existence of the weapons is a secret. The aggressive nation denies that they exist. What should you do?
2. Ask students to respond, and note their suggested actions on the blackboard. After gathering all the possible ways they might respond, ask them: How, as President, would you reach your decision on what to do? Discuss with them ways in which they think a President does, or should make decisions.
3. Point out that the above scenario is not far-fetched, but actually faced President Kennedy in October 1962.
4. Have students read the handout. Focus their attention not only on the options, but on the ways they were debated, and the way the decision was reached.
5. Have students complete the Decision Tree and respond to the questions at the end of the handout.

Notes to the Teacher: Answers to questions on the handout: (1.) Soviet offensive missiles were being placed in Cuba; (2.) Air strikes to destroy the missile bases, or a blockade to stop new missiles and equipment from being delivered to Cuba; (3.) Neither option could guarantee the destruction or removal of missiles already in Cuba; air strikes might require a full-scale military invasion of Cuba; the Soviet Union might respond militarily; Soviet ships might challenge a blockade; (4) To blockade Cuba; (5) Decision left to the class -- answers will vary; (6) A variety of government officials were invited to express their candid opinions, criticize others' suggestions, and raise all possible objections to proposals; (7) Members of Ex Comm settled on two likely options, prepared full reports, drafts of the President's speech, and responses to situations that might follow. Members also warned the President what the consequences might be of either decision; (8) Diplomatic negotiations with the Soviets; (9) When the President chose to respond to an earlier proposal by the Soviet Union, in which they removed their missiles in return for a pledge by the U.S. not to invade Cuba, and when the Soviets accepted that agreement and turned their ships around.

Evaluation: Answers to the questions on the handout, completion of the Decision Tree, and classroom discussion.

Handout: Ex Comm and the Cuban Missile Crisis

Background to the Crisis

In October 1962, the world came very close to nuclear war[1] when the United States discovered Soviet offensive missile bases on Cuba and demanded they be dismantled. For thirteen days, between October 16 and 29, tensions mounted until the Soviets agreed to remove the missiles and the crisis ended peacefully. During those tense days, President Kennedy made use of a special group of advisors, known as Ex Comm (Executive Committee of the National Security Council) to present, explore and debate all of the possible options open to the President.

Ex Comm included the Secretaries of State and Defense and their top staff, the director of the CIA, the National Security Advisor, the chairman of the Joint Chiefs of Staff, and on some occasions the Vice President, the Ambassador to the United Nations, and Congressional leaders. This group met almost continuously during the crisis and was encouraged by the President to speak out openly and to argue forcefully for their differing proposals and opinions. From their deliberations, the President was able to grasp fully all of the alternative courses of action open to him, and their possible risks.

This lesson will examine some of the arguments made in the Ex Comm, and how the President used this mechanism to help solve the gravest challenge to his administration.

The Cuban Missle Crisis

On October 16, CIA officials presented the President and Ex Comm with high-altitude photographs taken by U-2 planes flying over Cuba. These photographs demonstrated conclusively that the Soviets were placing missiles in Cuba, capable of firing atomic weapons at the United States. It seemed clear that the Soviets had lied when they promised not to place such missiles in Cuba.

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[1] Opinions vary among experts as to whether the world came close to nuclear war; however, this was the perception of the American people at the time.

101

Alternatives Presented to the President

1. A small minority of Ex Comm felt that the missiles did not change America's defense capacity and that the U.S. should take no action against them.

2. Most members initially favored a suprise air strike to destroy the missile bases before they could launch missiles against the United States.

3. Defense Secretary Robert McNamara disagreed that air strikes could knock out all of the bases, and believed that a full-scale military invasion would be necessary to complete the job. Instead, he recommended that the U.S. conduct a naval blockade of Cuba to prevent further missiles and equipment from reaching the island.

Debate Over the Alternatives

Those who wanted an air strike responded that a blockade would neither stop work on the bases or remove the missiles already in Cuba. Members of the Joint Chiefs of Staff unanimously favored immediate military action.

President Kennedy was skeptical of military views that the Soviets would not respond to a military attack on Cuba. He believed that if the Soviets did not act in Cuba, they would retaliate by blockading Berlin.

Former Secretary of State Dean Acheson argued that the President must protect the security of the United States by destroying the missiles in Cuba.

Attorney General Robert Kennedy, the President's brother, supported the idea of a blockade. He argued that America's history and traditions ran against launching a surprise attack on a smaller nation. Such an action would weaken America's moral position at home and abroad.

Ex Comm was now deeply divided between those favoring an air strike and those favoring a blockade. Feeling the pressure that a wrong decision could trigger a nuclear war and destroy all humanity,[2] the members

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[2] Opinions differ on whether or not all humanity would be destroyed. It is questionable whether the missile capacity to do this was available at the time.

continued their deliberation. They divided into groups to write out their recommendations to the President, and draft his speech to the nation. They were also asked to anticipate all conceivable consequences that might result from the action and recommend how to deal with them. After writing their papers, the groups exchanged and criticized each other's work.

Those advocating a blockade had outlined the legal reasons for a blockade, called for meetings of the Organization of American States and the United Nations to deal with the crisis, and outlined procedures for stopping Soviet ships and responding to any military force that might be used. Those advocating air strikes listed their targets, outlined the way they would defend their actions to the world, and suggested a letter to the Soviet leadership warning against any retaliation against Berlin or any other trouble spot in the world.

The decision was now up to the President.

President Kennedy's Decision

On Saturday, October 20, both sides made their presentations to President Kennedy. After considerable discussion, the President decided in favor of a blockade.

The President was convinced of the wisdom of his decision after further military advice that the Air Force could not be certain of destroying all missile sites in Cuba with a surprise attack. If a blockade would not remove the missiles, neither would an air attack.

On Monday, the President met with Congressional leaders. They also favored air strikes, but the President remained committed to a blockade, and announced his decision on national television that evening.

Diplomatic negotiations continued during the tense days as the blockade went into effect. The world watched as Soviet ships steamed toward the American blockade around Cuba, wondering if they would turn back, or if there would be a confrontation.

On October 26, Soviet Premier Krushchev sent President Kennedy a long, rambling secret letter in which he warned of the danger of nuclear war. "What good would a war do you?" Krushchev wrote. "You threaten us with war. But you well know that the very least you would get in response would be what you had given us; you would suffer the same consequences."

Then Krushchev made an offer: "I propose: we, for our part, will declare that our ships bound for Cuba are not carrying any armaments [missiles]. You will declare that the United States will not invade Cuba with its troops and will not support any other forces which might intend to invade Cuba. Then the necessity for the presence of our military specialists in Cuba will be obviated [made unnecessary]." Then, the next day, Krushchev sent a second, more formal letter with an added demand: that the United States must also remove its missiles from Turkey. President Kennedy felt that to accept this second demand would weaken NATO. He decided to accept Krushchev's first offer and to ignore the Turkish missile demand.[3]

The gamble worked. At the last moment, the director of the CIA brought word that Soviet ships had stopped dead in the water. They would not confront the American blockade. The Soviet Union accepted the American pledge against invading Cuba, and turned their ships around. The missile bases were dismantled and the crisis ended. As Robert Kennedy wrote, "For a moment the world had stood still, and now it was going around again."

Evaluating Decision Making During the Cuban Missile Crisis

Use the Decision Tree, working from the bottom up, to help you answer the following questions:

1. What was the occasion for the decision facing President Kennedy?
2. What alternatives did Ex Comm recommend?
3. What were negative consequences of these alternatives?
4. Which alternative did President Kennedy choose?
5. What is your judgment of President Kennedy's decision? Why?

Further, consider the ways in which decisions were reached during the Cuban Missile Crisis:

6. In what ways did Ex Comm permit full discussion of the problem and the options to solve it?
7. How did Ex Comm help the President reach his decision?
8. What steps were necessary to solve the crisis after the President reached his decision?
9. How was the Cuban Missile Crisis finally solved?

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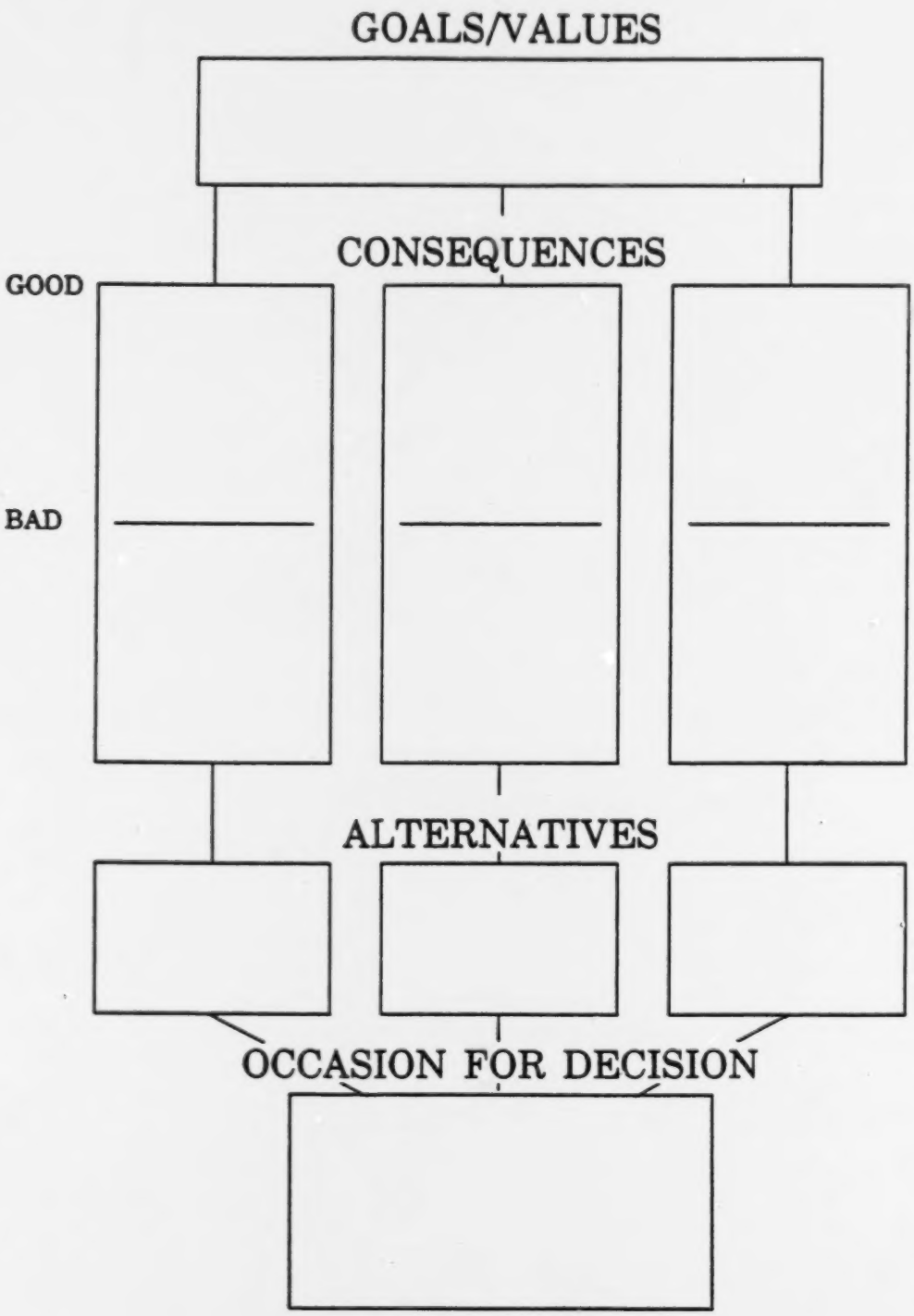
[3] Missiles were removed from Turkey soon after the Cuban Missile Crisis; however, it is questionable whether this was a cause and effect relationship.

DECISION TREE



The decision-tree device was developed by Roger LaRaus and Richard C. Remy and is used with their permission.

UNIT 3 LESSONS

UNDERSTANDING AND PRACTICING COMMUNICATION

Conflict Management and Resolution Skills--

"Why do we need Rules?" 111

Cooperation Skills--

"Cooperation Activities for Elementary School Students" 113

"Practicing Non-Verbal Communication Skills" 115

"Stepping Stones to Successful Participation Projects" 117

Communication Styles and Content--

"Improving Listening and Transmission" 123

"Recognizing Propaganda" 127

"The Peace of Paper" 130

Democratic Action: Using a Variety of Methods to Make Your Voice Heard--

"Learning Positive Ways to Express Emotions" 133

"Democratic Action: What are the Options?" 135

"Making A Difference--What Can I Do?" 137

UNIT 3: UNDERSTANDING AND PRACTICING COMMUNICATION

What is good communication? Can students recognize and practice it? What is poor communication? Can students recognize that and improve it? How good are they at handling disputes and conflicts? Unit 3 focuses on a category of skills universally regarded as crucial in the nuclear age: the ability to resolve or manage differences among people and nations without devastating violence or warfare. Although the ability to settle arguments on the playground does not necessarily lead to the ability to mediate international conflicts, many of the communication and negotiation skills needed for the latter must be learned in childhood.

This unit addresses a specific set of skills, but the examples will illustrate that the development and practice of these skills may occur in virtually every course and school activity and certainly at every age level. Developmental stages might provide a helpful guideline: the most immediate, concrete activities could be based on things that actually happen at school; later, students could learn about conflict resolution and management by analogy to what they read in novels, biographies, myths and legends. Older students could study the concepts of communication analytically, using the skills they learn in their own lives and in their growing contacts with others. And educators themselves might consider the examples of communication and conflict resolution and management they set for their students in their own teaching.

The primary goal of Unit 3 is straightforward: to provide students with the skills to practice good communication and to repair or manage the problems caused by bad cummunication. These skills should be considered a K-12 responsibility, a sequence of activities with consistent standards and expectations throughout the school or district.

Examples of specific subject-area teaching of communication skills might include:

Health: handling personal conflicts; interpersonal communication and interactions; family living; psychology; counseling activities.

Physical education/athletics: sportsmanship towards teammates, opponents and officials, whether as a player or spectator; leadership; team play.

Lab sciences: team approaches to study; lab partners.

Mathematics: game theory; results of competition and cooperation; zero-sum games.

Social studies: historical examples of conflicts resolved and unresolved; communication as a factor in historical events; communication in other cultures; practices of negotiation.

English language arts: analysis of biography and fiction to examine how others have approached conflict; expressing personal conflicts and experiences in speech and writing.

Arts: artistic expression as a means of communicating personal conflict as well as resolving or managing it.

Foreign language: learning to ease communication with other cultures; understanding issues of importance to other cultures.

School activities which provide opportunities to examine and practice the skills of communication and conflict resolution and management might include:

- children's play, at every age level;
- how children settle problems among themselves;
- committee meetings involving students, faculty, administration, parents or school boards;
- school social activities and sports events;
- establishment of a school "tone," or atmosphere.

Topic: Conflict Management and Resolution Skills

Title: "Why Do We Need Rules?"

Source: Reprinted with minor changes from Nuclear Age Issues: A Teacher's Resource Guide, Los Angeles Unified School District, Office of Instruction, Publication No. X-127, ©1987, pp. 67, 71-72. Reprinted with permission.

Essential Learning Skills: 2.3 (c,d), 3.1 (g), 4.2 (c), 5.1 (a,b,c,e), 5.2 (b,c,d), 5.3 (a), 5.6 (a,e), 5.7 (a,b,c), 6.2 (b), 6.3 (f,g), 6.4 (e), 6.5 (a,b), 6.6 (a)

Suggested Grade Levels: K-3

Suggested Time: Varies with activities

Suggested Course Content: English language arts, social studies, art

Objectives:
A. To discuss and explain why rules are needed.
B. To discuss whether or not a specific rule is fair and explain reasons for the choice.
C. To participate in cooperative games.

Procedure:
1) The teacher presents an example of a fair rule that is applied during lunch time when people line up to await their turn for food. The teacher and students discuss why the rule is a good one. Discuss other rules that are fair.
2) The teacher guides students into dictating a group story describing fair rules.
3) The teacher reads or tells a story about a child who wanted to play with other children but who was left out of the game. The class discusses why the rules for participating in the game were unfair to the child.
4) Engage students in one or more of the following activities:
   (a) Divide the class into two random groups of equal size and take the students to the yard. Explain that students in the first group will play their favorite game while members of the second group will sit on the bench with their hands folded and watch. After 10 minutes the students return to the classroom and discuss their feelings.
   (b) Divide the class into small groups. Ask each group to make up a fair or unfair rule. Have members of each group pantomime their rule, discuss whether or not each rule is fair, and explain the reasons for their choice.
   (c) Read Two is a Line by Jon Madian and discuss with students why rules are needed.
   (d) Have students work in groups to develop a three-frame cartoon strip demonstrating situations in which rules or interactions are needed to solve a conflict. (You may suggest a conflict such as a group of older students not allowing a group of younger students the use of playground equipment.) The first frame can show a possible solution, and the third frame the outcome of the solution. Have students share and discuss their cartoons.

(e) Show and discuss the following filmstrips: "You Got Mad: Are You Glad?" and "Guess Who's In A Group." (Guidance Associates). These filmstrips provide positive behavioral choices to solve conflicts and reduce hostilities. Have students articulate ways in which people resolve hostilities and conflicts.

(f) Have students discuss and participate in any or all of the following cooperative games:*

- Two partners sit back to back, with bent knees and linked arms. Leaning on one another, they try to stand up.
- Two partners stand facing one another, palms touching, about 2-3 feet apart. They take turns falling toward each other and being supported by their partner's palms. (Stress safety issues.)
- Partners stand facing one another and stretch their arms straight out in front until palms are touching. Both partners then close their eyes, drop hands, and turn around in place three times. Keeping eyes closed, they then try to reconnect by touching the palm of either one of both hands.
- Make a tight, shoulder-to-shoulder circle with all of the children present. Everyone turns in the same direction. At a signal, everyone tries to sit on the lap of the person behind. Great hilarity! (Stress safety issues.)

(g) Have students draw pictures of children playing together using fair rules.

(h) Have students formulate a set of fair rules regarding school and classroom activities.

Evaluation: Students should be able to explain why rules are needed and why they think certain rules are fair or unfair.

* Adapted by the Los Angeles Unified School District from Dialogue: A Teaching Guide to Nuclear Issues, (Cambridge, MA: Educators for Social Responsibility, ©1982), p. 65.

Topic: **Cooperation Skills**

Title: **"Cooperation Activities for Elementary School Students"**

Source: Reprinted with minor changes from Creative Conflict Resolution: More than 200 Activities for Keeping Peace in the Classroom K-6 by William J. Kreidler, Scott, Foresman and Company, Glenview, Ill, ©1984, pp. 134-136. Reprinted with permission.

Essential Learning Skills: 6.3 (a-g), 6.6 (a)

Suggested Grade Levels: K-6 (varies by activity)

Suggested Time: Varies by activity

Suggested Course Content: Teacher's choice

Objective: To develop and practice cooperation skills through a variety of activities.

Procedure: Engage students in one or more of the following activities:

1. TOTEM POLE (Grades K-2)
   - Materials: boxes, paint, white glue, art junk (paper scraps, cardboard tubes, fabric, spools, styrofoam)
   - Procedure: (a) Divide the children into groups of three or four. Give each group a box. The group should decide what color or colors to paint the box. (b) When the boxes have dried, set out the glue and junk materials. Have each group decide how they will make a face on the box, and how they will embellish it. When they have decided, they may begin working. (c) When all the groups are finished, stack the boxes, largest to smallest, to make a totem pole.
   - Discussion: ASK: What part of the project did you like best? How did you decide what your group would do? Did you have problems in your group? How did you solve them?
   - Note to Teacher: Pictures of actual totem poles enhance this project and give the children ideas. (Before you tie this in to a unit on Native Americans, be sure the tribes you are studying had totems; not all did.)

2. COMING TO CONSENSUS (Grades 2-6)
   - Procedure: (a) Write "consensus" on the board. Explain that there is a consensus when a group comes to a decision that is acceptable to everyone, even if it is not everyone's first choice. (b) With the class, brainstorm a list of 25 or so possible field trips. Then have each person write down the five field trips on the list that he or she would like to take. (c) Put the students in groups of three. Have them come up with a list of four trips they would all like to take (d) Combine groups so that there are groups of six. These groups should choose two trips by consensus. (e) The groups should then report to the class. Combine the lists, and have the whole class come to a consensus. (The logical follow-up is to take the field trip.)
   - Discussion: ASK: What problems did you have coming to consensus? How did you come to agreement? What were your reasons for your choices?

3. TOOTHPICKS (K-6)
   - Materials: Toothpicks (about 1,000 for 20 students)
   - Procedure: (a) Have the students work in pairs the first time you do this activity. Give each pair a pile of about 50 toothpicks. (b) The task is for the children to make some kind of creation from their toothpicks. Anything is acceptable - a design, a picture, a sculpture - whatever they can come up with. The only ground rules are that each person get a chance to help decide what the creation will be and that each person get a chance to help make it. (c) After 15 minutes or so, have everyone stop. Give the class a chance to wander around and see what everyone has made. (d) Repeat this activity a number of times. Each time, increase the number of students in the group.
   - Discussion: ASK: What did you decide to make? What problems did you encounter in deciding? How did you solve them? What problems did you have with the materials? How did you solve them?
   - Note to Teacher: If students use white glue to affix the toothpicks to bases of tagboard or cardboard, the creations can be made permanent.

Evaluation: The focus of the above activities should be on process rather than product. Students should be evaluated as group members on their cooperation skills and/or their ability to solve problems in a cooperative manner. Evaluation should be used to help students improve their skills (formative) rather than to pass judgment on their ability (summative).

Topic: Cooperation Skills

Title: "Practicing Non-Verbal Communication Skills"

Source: Jane Mize, Cedar Park Intermediate School (Beaverton School District), PO Box 200, Beaverton, OR 97075.

Essential Learning Skills: 3.1 (g), 6.1 (a), 6.3 (a.g), 7.1 (b)

Suggested Grade Levels: 3-7

Suggested Time: 30 Minutes

Suggested Course Content: English language arts or could be adapted to any content area.

Objective: To identify and examine positive and negative aspects of completing a group task using only non-verbal communication.

Materials: 3 x 5 note cards (200-300), butcher paper, tape

Procedure:

1. Divide class into groups (3-5 students per group).
2. Explain to students: (a) you will build a tower of cards; (b) You will not be able to talk to each other; (c) you need to build the highest tower; (d) you may use only tape and cards; (e) you have a 10 minute time limit
3. Spread groups throughout the room.
4. Hand out an even number of cards to each group.
5. Hand out only one roll of tape per group.
6. As students build towers, put up two large pieces of butcher paper:
   (a) Label one piece "Positive Behaviors"
   (b) Label one piece "Negative Behaviors"
7. Call time after 10 minutes. Let students look at the towers.
8. Have students generate a list of positive behaviors first, then negative behaviors (10-15 minutes). Positive behaviors may include: (a) compromise; (b) work together; (c) eye contact; (d) take turns; (e) try different ways; (f) share resources. Negative behaviors may include: (a) could not talk; (b) did not look at each other; (c) stealing tape (resources); (d) no plan; (e) some people too bossy; (f) not taking turns.

Extending the Lesson: Provide students with background information related to how the U.S. and U.S.S.R. communicate, especially in regard to potential for war (e.g., "hotline") Have students indicate both positive and negative aspects of those communication forms.

Evaluation: Have students list three positive behaviors they can use the next they have to work in a group with others.

Topic: Cooperation Skills

Title: "Stepping Stones to Successful Participation Projects"

Source: Developed by the Division of Curriculum and Instruction, New York City Board of Education, 131 Livingston Street, Brooklyn, NY 11201. Illustration from New York State Department of Education. Reprinted with permission.

Essential Learning Skills: 6.3, 7.3 (more depending on project selected)

Suggested Grade Levels: K-12

Suggested Time: Varies by project

Suggested Course Content: Appropriate to all subject areas

Objectives:

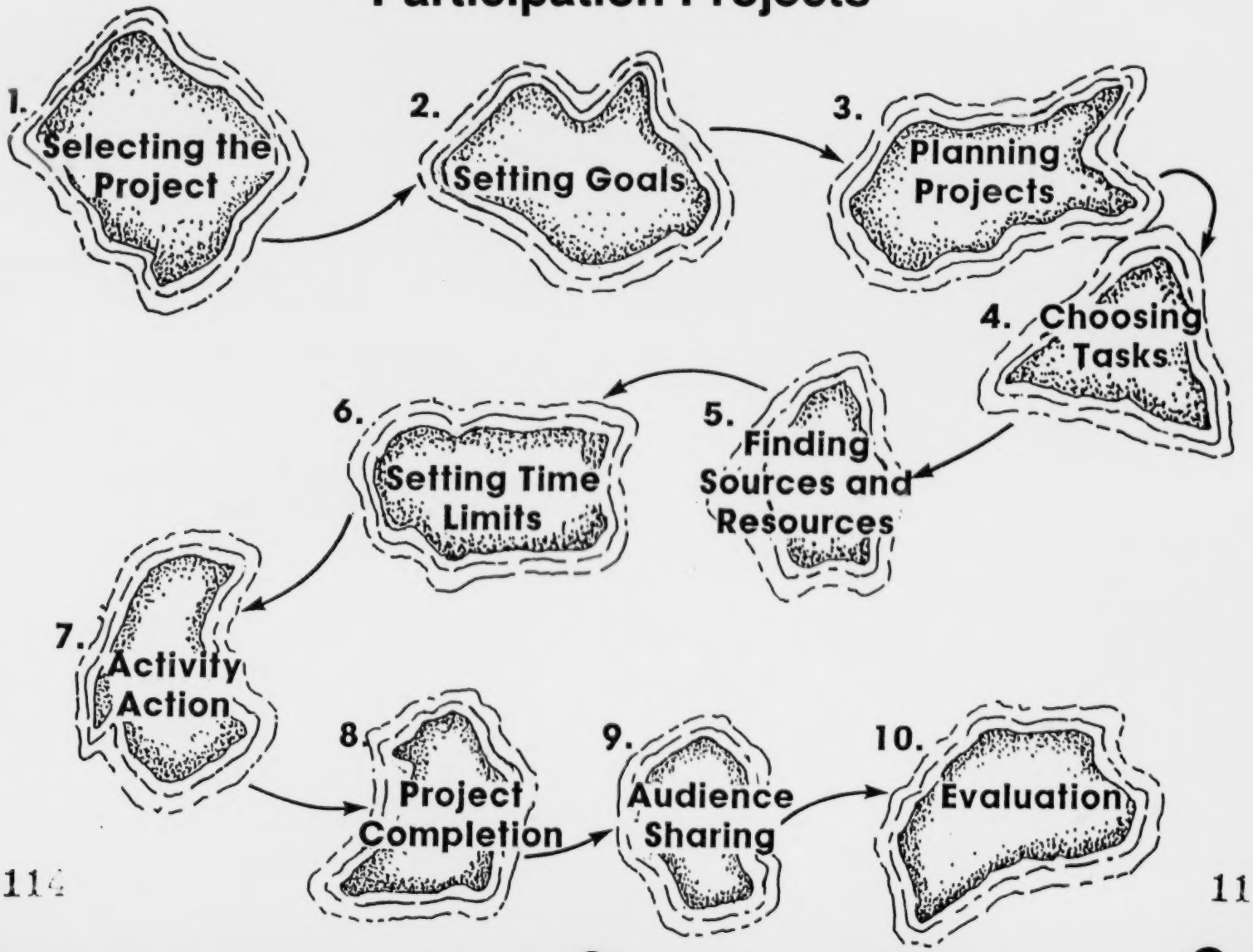
A. To develop meaningful relationships in the minds of students between content study and real life applications of learned material and skills.
B. To facilitate the integration of content areas through an interdisciplinary approach.
C. To meet the diverse needs of all types of learners through activities that allow for contributions from all students.
D. To provide for many types of expressive outlets suitable to all talents and abilities.
E. To facilitate the integration of cognitive, creative and affective learnings.
F. To emphasize active participation as a building block of citizenship.

Procedure: Because Participation Projects can extend over long periods of time and include several content areas, it is easy to feel overwhelmed by their scope and range. However, the key to successful accomplishment of any such project lies in the very title Participation Projects. The projects should be planned <u>with</u> students, and students are expected to carry out many of the major roles necessary for completion of the projects as a vital part of the learning process. If the teacher's role is seen as a guide and facilitator, the task is reduced to manageable size.

The Stepping Stones guidelines offer suggestions for developing and managing Participation Projects leading to maximum learning and enjoyment for teachers and students. The chart provides an outline of the sequence of major steps in any Participation Project. This can be copied and placed on a bulletin board or placed where students can easily refer to it daily. As each step is completed, an indicator can be placed on that step, allowing students a visual record of what has been done and what needs to be accomplished. Simplification might need to be made to adjust for your grade level, but the basic steps remain the same throughout the development of any Participation Project.

Evaluation: Students should be evaluated on both the process <u>and</u> product of their Participation Project.

Stepping Stones to Successful Participation Projects



PARTICIPATION PROJECTS STEPS: SOME GUIDELINES
(Prepared by Elliot Salow, Director of Social Studies, New York City)

Stepping Stone 1: SELECTING THE PROJECT

It is imperative to the development of citizens capable of making wise choices to be a part of the process of choosing the project to be undertaken. Even if the teacher feels strongly in favor of certain Projects, he/she can most likely provide at least two choices. This still affords pupils the opportunity to participate in the selection process, which should include:

- Suggesting alternatives
- brainstorming pros and cons
- listing and discussing pros and cons
- voting
- accepting the decision

Stepping Stone 2: SETTING GOALS

Even the youngest of children should be involved in developing, setting and working to meet goals. As with all the steps in the Participation Project process, the relationships to real life should be pointed out, discussed, and clarified. Goal setting should include:

- discussing all possibilities
- selecting and listing goals for individuals and groups
- refining the list to those goals that are relevant and possible
- planning ways to accomplish goals

Stepping Stone 3: PLANNING PROJECTS

Involving students in the planning of each part of a project helps to provide a clear mental picture of what is expected and generally results in increased cooperation and response. This step affords excellent opportunities to utilize techniques such as "webbing," brainstorming, etc., as well as allowing for differentiated instruction through plans developed by, as well as for, special needs of specific students.

Stepping Stone 4: CHOOSING TASKS

Students should be encouraged to honestly assess personal and group strengths and needs, talents, and weaknesses. Through the use of "job applications," discussions of necessary skills, etc. pupils can be guided toward realistic individual and group choices of tasks for the project. Application of this introspection to future career choices is obvious.

Stepping Stone 5: FINDING SOURCES AND RESOURCES

Involving students in this planning aspect not only increases their level of active participation, but provides an opportunity to expand their awareness of the variety of resources available. It is important to emphasis going beyond books to include human and multi-media sources. Equally important is a stress on reaching out into the community, affording chances to guide students in telephone and interview techniques, and in seeing practical uses for skills such as letter writing. Each of these activities stresses much needed organizational skills, which are in turn applicable to many other academic and life areas.

Stepping Stone 6: SETTING TIME LIMITS

By postponing the setting of time limits to this stage of the project process, students are more aware of the scope of the activity through their participation in planning and are better able to anticipate required amounts of time necessary for completion. Realistic planning time aids in the successful meeting of goals. By meeting the time limits of the project, students are learning how to budget their time.

Stepping Stone 7: ACTIVITY ACTION

As good citizenship requires active participation, this step is imperative and must involve each pupil in some way. Several considerations of importance to success are:

- daily checks of each task group
- weekly evaluation sessions of group reports by the entire class stressing constructive use of criticism
- use of planning charts as visual means of planning for individuals and groups
- checklists which provide for ongoing review

Stepping Stone 8: PROJECT COMPLETION

This stage involves setting standards, listing criteria, and assessing work to date. These steps form the basis for completion of the project. Creative problem-solving skills, brainstorming, and encouragement of divergent thinking can be applied to settling problems and disputes which may arise at this point.

Stepping Stone 9: AUDIENCE SHARING

It is vital to Participation Projects, which require more time and effort than day-to-day activities, that the product be shared. Feedback is very important in helping children to realistically assess their work. Use of organized means of obtaining opinions will aid pupils in future research projects.

Stepping Stone 10: EVALUATION

Essential to adult life is the ability to reflectively and critically evaluate one's work. Participation Projects should allow this process to develop in a nonthreatening atmosphere, free from direct or indirect punitive measures in order to lead to growth in honest and open evaluation. This process might include evaluation forms, oral feedback, and critiques from the experts. Positive aspects should be brought out and reinforced, with stress being put on evaluation in relation to previously set goals.

Topics: Communication Styles and Content

Title: "Improving Listening and Transmission"

Source: Reprinted with minor changes from Creative Conflict Resolution: More than 200 Activities for Keeping Peace in the Classroom K-6 by William J. Kreidler, Scott, Foresman and Company, Glenview, Ill, ©1984, pp. 92-94. Reprinted with permission

Essential Learning Skills: 1.3 (c), 2.3 (a), 5.5 (a,b), 6.1 (a), 6.2 (b)

Suggested Grade Levels: K-6 (varies with activity)

Suggested Time: Varies with activity

Suggested Course Content: Introduction in English language arts and reinforced in all relevant content areas.

Objectives:

A. To understand how voice pitch, volume and clarity have an effect on conflict.
B. To listen for all pertinent information related to a conflict situation and to understand how the presence or absence of such information affects our perception of the conflict.
C. To understand through practice the advantages and/or disadvantages of summarizing and paraphrasing accurately.
D. To understand the value of reflective listening in avoiding, managing or resolving conflict.

Procedure: Engage students in one or more of the activities below, which have been correlated to the objectives listed above:

A. **"How You Say It" (Grades K-6) Objective A**
Voice pitch, volume, and clarity have an effect on conflict. High-pitched, shouting, or mumbling voices are abrasive and can escalate conflict. The following are voice exercises that students can try.

1. Speaking loudly without shouting is easy when you speak from the diaphragm. Show the children where their diaphragms are. Have them stand erect and place their hands on their diaphragms. Then ask them to say "Ho, ho, ho, ho, ho!" while concentrating on making the sound come from the diaphragm. Once they've accomplished this, have them say words and sentences while concentrating on making sound come from the diaphragm. Try also having the children participate in conversations standing across the room from each other, the object being to practice speaking loudly without shooting.
2. To practice enunciation, give the class a choral reading passage. As they read, have them enunciate each word in an exaggerated fashion. Repeat this exercise regularly to help students break the mumbling habit.

Discussion: Why would speaking clearly be useful in resolving conflicts? What effect might shouting or mumbling have on conflicts.

B. **"Sifting for Five W's" (Grades 3-6; adaptable to K-2) Objective B**

1. Discuss what kinds of information people need to begin resolving conflicts. When one of the five W words comes up in the discussion, write it on the board. Add those that don't come up.
2. Tell the class that you have a listening exercise and that they'll need to listen for the five Ws--who, what, when, where, and why. Read descriptions of several different conflict situations. Have the students identify the who, what, when, where, and why of each situation.

Discussion: Which of the five Ws were not present in this story? How does their absence affect your perception of the situation?

Young children can do this activity if you focus on only one or two five W words at a time.

C. **"Summaries of Summaries" (Grades 4-6) Objective C**

Materials: News stories involving conflicts, pencils, paper
Procedure:

1. Have students bring in news stories involving conflicts, and then have them write short paragraphs summarizing the stories. Remind them to include the five Ws.
2. Have each student pass the completed story to a friend, who is to come up with a headline that more or less summarizes the story.

Discussion: Did your headline writer accurately summarize your story? Why is it important to be able to summarize accurately?

D. **"Pete and Repeat" (Grades 2-6) Objective C**

1. Explain what paraphrasing is. Give the students some practice by helping them paraphrase the following:
   It's very warm out today.
   I saw some boring TV shows last night.
   We're going to take an interesting field trip.
   The book I'm reading now is exciting.

2. Have the students pair off. Designate one student as Pete and the other as Repeat. Explain that whenever Pete says something, he or she will stop for a moment, and Repeat will paraphrase it. Pete should nod or say "uh-huh" if it is an accurate paraphrase.

3. Have all the Petes talk about things they did this morning. After a few minutes, stop the activity and have the students switch roles. Then continue as above.

Discussion: Was it easy or difficult to paraphrase accurately? What problems did you encounter when you tried to paraphrase? Can you see any advantages to paraphrasing in conversations? Can you see any disadvantages?

E. **"You Sez, I Sez" (Grades K-6) Objective D**
1. Have the class sit in a circle. One child should begin by making a statement such as "My favorite Sunday activity is _____."
2. The next child reflects this by saying, "You say you like to watch TV on Saturday; I say I like to visit my father." Continue around the circle, each child giving his or her opinion after reflecting the previous child's.

Extending the Lesson: Additional activities for this and other topics related to improving and practicing communication skills can be found in the source book.

Evaluation: Assess student performance of skills and understanding concepts through observation and responses to discussion questions.

Topic: Communication Styles and Content

Title: "Recognizing Propaganda"

Source: Reprinted with minor changes from Decision Making in a Nuclear Age, Halcyon House, Inc., Weston, MA, and Educators for Social Responsibility, Cambridge, MA, ©1983, pp. 21-24. Reprinted with permission.

Essential Learning Skills: 1.2 (c), 3.1 (c,f,h), 4.1 (b,c), 4.2 (e), 4.4 (c,d), 5.2 (a), 5.4 (e), 5.5 (c), 6.1 (b) 6.6 (b)

Suggested Grade Levels: 9-12 (adaptable 7-8)

Suggested Time: 2-3 days

Suggested Course Content: English language arts, social studies

Objectives:
A. To recognize and identify the purpose and effect of value-laden language.
B. To understand that language can be used to manipulate emotions.

Procedure: Explain to students that language which rallies citizens around the rightness of a cause is called propaganda. Value-laden language can be an especially powerful weapon in propaganda. Do the following short exercises to help students see how they and others use language to elicit feelings.

1. **Hot Words** and **Cool Words** can describe the same behavior, but produce an emotional (Hot) or neutral (Cold) response.
   Behavior: Wilma moves around when she talks.
   Critical Words: Wilma is hyper.
   Insulting Words: Wilma is schizzy and a twitch.
   Praising Words: Wilma is energetic.
   ASK: How do these words produce a hot or cold reaction?
   Have students write hot words for the following behaviors:
   (a) Behavior: Lee is 5' 8" and weights 100 pounds.
   (b) Behavior: Gene leaves clothes on the bathroom floor for weeks.
2. Some words are **euphemisms**, pleasant words substituted for offensive ones. Have students consider the following examples and explain why they are euphemisms.
   (a) In day-to-day conversation we say: passed away, rest-room, underachiever. (b) In a war we say: relocation, protective reaction strikes, resources control program, interdiction (bombing), new life hamlet (refugee camp).
   (c) In a criminal prosecution of a wrongdoing, we say: inappropriate act, electronic surveillance.
3. Just as euphemisms cloud meaning, so do **exaggerations**. These words don't label people but they are vivid images of aspects of nuclear arms issues. What does each mean and how might it be an exaggeration? Holocaust, window of vulnerability, domino theory, extinction of the species, doomsday clock, Free World, missile gap, Armageddon.

4. People often use **name-calling** to teach people to hate. This often results in dehumanizing an enemy. Many of these names are categorized as racist names. Some examples are:
   - "Gooks," "Slants," "Commies," "Infiltrators," "Charlie," "Ruskies," the "Huns," "Redskins," "Guerillas," "Rebels."

   ASK: What kind of connotations do these words have? If they are racist terms, how do they describe the groups in question?
5. People use **inflamatory words** in the nuclear arms debate to describe their opponents. Half these words are used to describe people who support increasing nuclear weapons for national security and half describe those who support decreasing nuclear weapons for national security. Group the words under each of the headings: people supporting increase, people supporting decrease. Have students use the dictionary if they need to.
   - Alarmist, militarist, idealist, dove, hawk, warmonger, anti-American, Fascist, utopian, peacenik, right winger, triggerhappy, soft on communism, reactionary, diehard liberal.

   ASK: What is the effect of using a word like "triggerhappy" to describe a person's position?
6. The automobile industry chooses words like "cougar" to name its cars, because such words suggest speed, a touch of danger, or excitement. Have students use a dictionary to look up each of the following names of U.S. missiles. What does each word mean? What does each meaning suggest? Then have students formulate a generalization about why they think these words were chosen to be the names of missiles.
   - Pershing, Lance, Titan, Minuteman, Trident, Polaris, Poseidon, Tomahawk, Peacekeeper.
7. Given that language can be used to manipulate our emotions and that often we cannot investigate a controversial situation personally, how do we know who to believe? Ask students to draw up a list of questions that would help in deciding whether or not they should trust a particular reporter, columnist, politician, or anyone else giving their version of the "truth."

   Some suggestions:
   - Does this person rely heavily on euphemism or emotional language? What does the language used tell about his/her point of view? Does it report the facts?
   - What are his/her sources of information? Is he/she writing from firsthand experience?
   - Who is paying this person? Is he/she under pressure from employers to report events in a certain way?
   - Does he/she represent a group with a vested interest in the result?

Extending the Lesson:

1. Have students write about an imaginary, controversial event at school as it might be reported from two different points of view. Possible events: a teacher strike, a student suspension, a campaign to improve cafeteria food. Instruct students not to alter the facts, only use different language, such as hot words, euphemisms, etc.
2. Have students choose an article from the newspaper on a controversial issue, and rewrite it from another point of view.
3. Have students research ways governments use propaganda to further their national interests.

Evaluation:

A. See #1 Extending the Lesson.
B. Students should be able to explain the purpose and effect of value-laden language.
C. Have students locate value-laden language in speeches or writings and indicate its suggested meaning.

Topic: Communication Styles and Content

Title: "The Peace of Paper"

Source: Adapted from a draft peace writing unit designed by Gerry Foote, a teacher at Lincoln High School (Portland Public Schools), 1600 SW Salmon, Portland, OR 97205 and implemented in "Writer's Workshop" (grades 11-12), November 1987 - January 1988. Further refinement on this unit is planned by the author.

Essential Learning Skills: 3.1 (h), 5.1 (a-e), 5.3 (a), 5.5 (a), 6.1 (b)

Suggested Grade Levels: 10-12

Suggested Time: 2 days

Suggested Course Content: English language arts (writing), social studies (global studies)

Objectives:
A. To allow the expression of beliefs relevant to peace through a variety of writing experiences.
B. To think critically and examine values related to peace issues.

Procedure: Day 1:

Preparation: Select slides of landscape scenes which represent peace, and organize them in a carousel. Another option is to have students bring in their own appropriate slides.

Activity 1. "Peace as a Landscape"
Ask students to write (3-5 minutes) spontaneously a description of what peace would look like if it were a landscape. Remind students to keep the pen moving - do not stop and think. Repetition is OK! Next, present the slide show (5-10 mins). After the slide show, ask the students to again write spontaneously, tying what they have seen to the theme of peace (3-5 minutes).

Activity 2. "Metaphors for Peace"
Teacher informs students that in this activity they will make the abstract idea of peace concrete through metaphorical images. At this point the teacher will ask what senses we have and list them on the board (smell, taste, etc.). The teacher lists colors and emotional experiences on the board. The teacher then instructs the students to write about peace, showing in concrete images, what peace would look like, taste like, smell like, etc. (5-10 minutes). The teacher writes also (on the overhead projector as an example, if desired). Students are then asked to share out loud any of the writing from the day (10-15 minutes).

Day 2: Preparation: Cut paper into strips (8 1/2 x 3/4"). Have eight strips for each student.
Activity 1.: "Recipes for Peace"
Hand out eight strips to each student. Ask students to write an "ingredient" on each slip of paper. The ingredients may include writing instructions such as "use a simile," "this line can have only five syllables," or "use three adjectives." At least half of the ingredients should have a content-oriented requirement related to peace and war, such as "use a synonym for peace," specific persons or events related to peace, or sentence beginnings like "peace will come when . . . " Students are to put only one ingredient on each slip of paper. Collect the slips and put them in a box.
Explain to students that they are about to participate in a collaborative writing exercise (because all contributed ingredients), but one where the resulting poem or prose will be each student's own writing. Sometimes in poetry and other kinds of imaginative writing when one writes with too predetermined an idea, the imagination shuts down. In this exercise the key is to be spontaneous and let the piece become what it wants to become.
Pass the box to each student and have them draw eight slips of paper and number them 1-8 before reading them. Instruct students to write spontaneously using each ingredient in order as they are numbered. Each slip may represent a line, a sentence of two or more lines, or merely a word or phrase as long as each is used in order. Students may vary the ingredients slightly to fit the poem (15-20 mins.). (For example: receiving Martin Luther King as an ingredient, one author used "one man had a dream" instead of using the name). Next, ask for volunteers to share their writings. They may give their recipes before or after reading their piece. Students should receive feedback as to whether or not their piece holds together.

Extending the Lesson: Students can select another eight slips of paper and complete the task again for homework.

Evaluation: Students and teacher critique of work in terms of writing style and content. Students should examine their own writing to identify ideas and values they have expressed.

Topic: **Democratic Action: Using a Variety of Methods to Make Your Voice Heard**

Title: **"Learning Positive Ways to Express Emotions"**

Source: Reprinted with minor changes from Creative Conflict Resolution: More Than 200 Activities for Keeping Peace in the Classroom K-6 by William J. Kreidler, Scott, Foresman and Company, Glenview, Illinois, ©1984, pp 114, 116, 121. Reprinted by permission.

Essential Learning Skills: 2.3 (a,c,d), 3.1 (g), 4.2 (c), 6.5 (a), 7.4 (c)

Suggested Grade Levels: K-4

Suggested Time: Varies by activity

Suggested Course Content: Teacher's choice

Objective: To develop positive ways to express "negative" emotions (i.e., anger, frustration).

Procedure: Engage students in one or more of the following activities:

1. THE BUG BOARD (Grades K-2)
   - Materials: crayons, drawing paper
   - Procedure: (a) Discuss feeling bugged, i.e., annoyed or angry. (b) Have the children draw and label a picture of something that bugs them. Young children will probably have to dictate labels to you. (c) Have the children show their pictures to each other and discuss them. Then post them on a bulletin board. This becomes the "bug board." Use the situations pictured as situations for problem puppets to explore.
   - Discussion: ASK: What do you do when someone or something bugs you? What else could you do? Do two or more of you get bugged by the same thing?
2. ANGER INTERVIEWS (Grades 2-4)
   - Procedure: (a) With the class, develop a questionnaire about anger, including such items as "What makes you angry?" and "What do you do when you're angry?" (b) Have students interview family and friends and then share the results with the class.
   - Discussion: ASK: What were some especially good ways to express anger? How did people react to your questions?
3. DISTRACTING (Grades K-4): Teaching Strategy
   - Procedure: (a) Establish a laughing corner. Laughter can dissipate anger and aggression. Have a scrapbook there of cartoons and books of jokes. You might also have clay, paints, little toys, balloons - whatever an angry child might use to distract himself or herself. (b) List the steps for a distraction dance. Post the following sequence to be completed quickly: clap hands three times; sit on the floor; kick your right foot; kick your left foot; jump up; wave arms; breathe in -- fill up with air; deflate slowly, like a balloon, onto the floor; in slow motion, stand; turn around three times; say aloud, "I'm calm now."

Evaluation: Provide feedback to students on their ability to find positive ways to express "negative" emotions.

Topic: **Democratic Action: Using a Variety of Methods to Make Your Voice Heard**

Title: **"Democratic Action: What are the Options?"**

Source: Tom Swinford, Arcadia Elementary School (Lincoln County School District), Toledo, OR 97391

Essential Learning Skills: 1.3 (b.,c), 2.2 (a,d), 2.3 (d,e,g), 3.1 (b), 5.5 (a-e), 6.1 (a)

Suggested Grade Levels: 5-8 (Adaptable 9-10)

Suggested Time: Preparation: 1 day; Library Work: 1-2 days; Presentations: 2-3 days; Chart/Discussion: 1 day

Suggested Course Content: Social studies, English language arts

Objective: To define, find examples, and explore the strengths and weaknesses of various forms of democratic action as avenues for affecting public policy including:

(a) rating
(b) running for public office
(c) initiatives and referendums
(d) working on political campaigns
(e) boycotts
(r) letters to the editor
(g) demonstrations and protests
(h) letters to public officials
(i) advertising
(j) press conferences
(k) art forms (visual or performing--"art with a message")
(l) town meetings

Procedure: Note to Teachers: Use Cooperative Group Learning strategies for this activity: (a) Assign students to heterogeneous-ability groups of 3-4; (b) Provide students with a handout specifically describing what you expect the group to accomplish in terms of product and process, and how long they have to do it. If students have little experience with group participation projects, give them a planning guide to assist them in their efforts; (c) Allow students 20-30 minutes to review the task and formulate their plans for accomplishing it. Encourage students to be specific in their planning in order to save research time (i.e., What resources they will use, who they will need to contact, etc.). Be sure to tell students that they will be evaluated as a group on both their product and process.

1. Using social studies and media center materials, have students (in groups) research one of the 12 methods of democratic action listed in the Objective. specifically, students should be asked to: (a) define and/or describe the method; (b) locate 3-4 examples showing how various individuals or groups have used the method in the past or are using it today to affect public policy; and (c) prepare an oral report for the class, using visual aides (posters, displays, slides, etc.) to present their findings.

2. As a class, make a chart showing the strengths and weaknesses of each method. Research groups should serve as primary contributors on their assigned methods of democratic action.

Extending the Lesson:

1. Provide student with examples (hypothetical or actual case studies) of individuals or groups who want to affect public policy on a particular issue. Have students select two methods of democratic action that they would recommend as potentially the most effective and explain why they made those selections.

2. Have students research a local issue and write letters to appropriate public officials.

Evaluation: Evaluate the group on its process and its product. Use the guidelines presented to students in a handout before the project as criteria for evaluation. Evaluate the students as group members rather than as individuals.

Topic: **Democratic Action: Using a Variety of Methods to Make Your Voice Heard**

Title: **"Making a Difference - What Can I Do?"**

Source: Reprinted with minor changes from The World Citizen Curriculum: Department of Education, State of Hawaii, RS 85-8654, September 1985.

Essential Learning Skills: 2.2 (a,d), 2.3 (c,d), 6.1 (a), 6.3 (f) 6.4 (b,d,e) 7.3 (a)

Suggested Grade Levels: 7-12

Suggested Time: Varies, one class period to get started

Suggested Course Content: Social studies

Objectives:
- A. To identify the extent to which students have participated in social action.
- B. To complete a list of sources of action to assist students in identifying channels for social action.
- C. To analyze the functions of various sources of action.
- D. To choose and participate in a social action project.

Procedure:
1. Introduce the activity. Distribute a copy of the "What Have I Done?" handout to each student. (Note: Teachers are encouraged to add items of local interest.) Allow a few minutes for students to answer the questions. Encourage some discussion, if appropriate, about the action some students have taken.
   ASK: How did your involvement come about?
   ASK: How did you feel about the contribution you made?
   ASK: What was the result of your contribution?
2. Distribute a copy of the "Sources of Action" handout to each student. Ask students to look over the handout and fill in the information asked for if they can. Provide telephone directories for students to access relevant community and regional information. For Part III on the "Sources of Action" handout, have students individually or in small groups, generate alternative responses for possible sources of action to the problem areas listed.
3. Briefly discuss the "Sources of Action" handout
   ASK: Do most people use the sources of action that are available to them?
   ASK: What are some groups or organizations that you think are making a difference in the quality of the world? Why?
   ASK: What groups or organizations might you want to support and assist?

4. Explain to students that the next step involves choosing an area of participation. The task is to create a Making a Difference Project for the class to engage in (You may wish to use the "Stepping Stones to Successful Participation Projects" model provided on pages 117-121. The following ideas are possible choices for projects: Community Service - fund-raiser for needy people, volunteer work for an organization, food and clothing drive, recycling drive, environmental clean-up or restoration; write letters to officials or organizations on issues of concern; hold a press conference on an issue of concern; contribute to underprivileged individuals such as the elderly, disabled, orphans, sick, poor, inmates, etc. by making gifts, creating drawings, poetry, or other artwork or by presenting a skit or short play.
5. Ask the class to brainstorm some additional "making a difference" projects that they might be interested in doing. Encourage them to create a project that contributes to what is "wanted and needed" in the community and the world. List suggestions on the board.
6. Assist students to make a list in priority order and choose a project with which to proceed. Encourage students to determine which choices are most wanted and needed. The project should be something that can be realized in the next two weeks, even though the students may wish to continue the project after that period.
7. Assist students in planning, developing, and executing their project. Encourage them to involve other students, parents, community volunteers, etc., in the project if they need additional assistance.

Extending the Lesson: Have students brainstorm and discuss other forms of action they might take to affect public policy. Analyze and evaluate the strengths and weaknesses of each proposed form.

Evaluation

A. (Objective D) Have students respond orally or in writing to the following questions:
   1. What did you learn from the Making a Difference Project?
   2. How did it feel to participate in the project? Do you think the project made a difference? Why or why not?
   3. Did your project contribute to synergy (combining people's energy in a creative and positive way)? Why or why not?
   4. What is the role of self-initiative in making a difference?

B. Evaluate handouts to assess objectives A, B, and C.

WHAT HAVE I DONE?

Review the following items and place a check by any of the things you have done. Have you ever:

1. ____ Done volunteer work in your community?
2. ____ Written a letter or spoken to an elected official about a problem situation that you are concerned about?
3. ____ Written a letter to the editor of a newspaper or magazine?
4. ____ Worked for a candidate in a political campaign?
5. ____ Written a letter of support for something or someone that you believe is making a difference in the quality of life.
6. ____ Contributed food, clothing or old belongings to needy persons?
7. ____ Taken steps to conserve or make wise use of natural resources and prevent waste?
8. ____ Assisted in raising money for a cause or organization you believe in?
9. ____ Assisted in protecting the natural environment of your community?
10. ____ Complained to a company about their products which you consider to be dangerous or of poor quality?
11. ____ Assisted in industrial or economic expansion, where appropriate.

OTHER:

12. ____ _____
13. ____ _____
14. ____ _____
15. ____ _____

SOURCES OF ACTION

I. Individuals and agencies available for assistance and information, or to whom you can voice your opinion:

Police Department _____
Address Phone #

Prosecuting Attorney _____
Address Phone #

Fire Department _____
Address Phone #

Mayor _____
Address Phone #

School Board Member _____
Name Phone #

City Council Representative _____
Name Address

State Representative _____
Name Address

State Senator _____
Name Address

U. S. Representative _____
Name Address

U. S. Senator _____
Name Address

Better Business Bureau _____
Address Phone #

II. Media Channels
T.V. Stations:

_____
Name of Station Address Phone #

_____
Name of Station Address Phone #

Radio Stations:

_____
Name of Station Address Phone #

_____
Name of Station Address Phone #

Newspapers:

Name of Newspaper	Address	Phone #
Name of Newspaper	Address	Phone #

III. Global Agencies and International Organizations:

List at least one group or organization which you think might provide a source of action for the following global situations. Consult the Resources and References section of the Student Resource Book, locate a Yearbook of International Organizations, or find other possible information sources related to these areas.

Global Situations	Possible Source of Action
A. Starvation and hunger	
B. Armament (weapons build-up)	
C. Human rights violations	
D. Health care inadequacies	
E. Environmental harm	
F. Poverty	
G. Violence	
H. Over-population	
I. Racism	
J. International terrorism	
K. Communist expansion	
L. Missile treaties and negotiations	
M.	
N.	
O.	

UNIT 4 LESSONS

EXAMINING NUCLEAR DEVELOPMENT AND THE QUALITY OF LIFE

What is Nuclear Energy and How is it Produced?--

"Fission, Chain Reactions, and Fusion" 147

"The Physics of a Nuclear Explosion" 155

Benefits and Limitations of Nuclear Technology: Economic, Societal and Ecological Issues--

"What are the Uses of Radiation?" 165

"Investigations into the Benefits and Problems Resulting from the Use of Energy" 175

"Discovering and Evaluating the Many Uses of Nuclear Energy" . . . 177

UNIT 4: EXAMINING NUCLEAR DEVELOPMENT AND THE QUALITY OF LIFE

What do students know about nuclear development? Is it properly integrated into what they learn about the 20th century and the world of today? Do they understand the importance, in history and in current events, of cause-and-effect, chains of events, and interactions of social and ecological forces?

The examples in this unit address two educational objectives: (1) students should learn how nuclear energy is produced; and (2) how nuclear issues affect the quality of life, both positively and negatively. Underlying all lessons in Unit 4 is the basic assumption that students should be given access to accurate information about issues that concern them directly. Facts, theories and interpretation should be clearly identified.

The examples of lessons and activities in Unit 4 are most appropriate for students in grades 4-12 as much of the content is conceptually difficult and/or too abstract for younger students. Similarly, a narrower range of subject areas may be involved in teaching these examples.

Science and social studies teachers should consider taking primary responsibility for providing information on nuclear development and its effects on society, although health and English language arts teachers could add significant supporting materials. Health classes might provide the best setting for studying the quality of life on a more personal level.

All the science courses should consider including appropriate lessons on the social and ecological impact of nuclear technology (including medical advances, industrial processes, modern-day research, military applications and political ramifications).

Math and science teachers should also discuss how to present students with ethical, moral and patriotic issues faced by many scientists and mathematicians in the course of their work.

Vocational education teachers should help their students to understand the role of nuclear technology in various jobs/careers and to evaluate the risks and benefits associated with working in such careers.

Topic: What is Nuclear Energy and How is it Produced?

Title: "Fission, Chain Reactions, and Fusion"

Source: Reprinted from The Harnessed Atom, U.S. Department of Energy, DOE/NE-0072 (for sale by the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402).

Essential Learning Skills: 1.2 (a or c), 2.1 (a,b,d), 2.2 (b), 3.2 (d), 6.1 (a), 6.5 (a)

Suggested Grade Levels: 6-9

Suggested Time: 1-2 class periods

Suggested Course Content: Science

Objectives:

A. To understand the main difference between nuclear fission and nuclear fusion.
B. To understand the difference between a chemical reaction and a nuclear reaction.
C. To understand the concept chain reaction.

Materials: Student Reader for each student, review Exercise for each student, simulation of fission chain reaction (large box with transparent top or clear plastic for a cover, snap-spring type mousetraps, ping-pong balls, long-handled tongs)

Procedure:

1. Introduce vocabulary: deuterium, fission, fission products, fusion, nuclear chain reaction, plasma, tritium.

2. Have students read the Student Reader.

3. Use the following questions for discussion:
   a. What is the main difference between nuclear fission and nuclear fusion? (In nuclear fission, energy is released when the nucleus of an atom is split apart. In nuclear fusion, energy is released when the nuclei of two atoms are forced together, or fused).
   b. Why aren't we using fusion to produce electricity? (Scientists have not yet learned to keep fusion reactions going for a long enough time to be able to use the reactions to make electricity.)
   c. What is the difference between a chemical reaction and a nuclear reaction? (In a chemical reaction, two or more atoms combine to form molecules, but the atoms themselves are not changed. In a nuclear reaction, the atoms themselves change. The reaction in a chemical reaction takes place in the electrons; in a nuclear reaction, the reaction is in the nucleus.)

4. Assign and discuss the Review Exercise.

5. Do the class demonstration "Simulation of Fission Chain Reaction." (This demonstration is also shown in the film, "The Atom - A Closer Look" by Walt Disney Productions.) A large box from an appliance store is a good size. Cut holes in sides and cover with plastic wrap. Use the box upside down so that the top is closed and the bottom is open. Set mousetraps and then set box over them.

Extending the Lesson: Another idea to demonstrate the concept of a chain reaction is to stand 12 matches one-quarter inch apart in clay in an aluminum pan. Light the first match and the others will flame up in a chain reaction.

Evaluation: Review exercise, discussion questions, and follow-up to the demonstration should give evidence of student understanding of the objectives.

What is fission?

After scientists found out about atoms and isotopes, they were able to build machines that cause atoms to split in a process called *fission* (FISH-ən). The fission process releases energy.

When a neutron strikes the nucleus of a heavy and unstable isotope such as uranium-235, it can cause the nucleus to split apart. All this takes about a millionth of a second.

When the atom of uranium-235 splits apart, many things happen. We end up with two lighter-weight atoms of new elements, which are called *fission products*. Two or three neutrons are released. And most importantly, energy is released, mainly as heat.

What is a chain reaction?

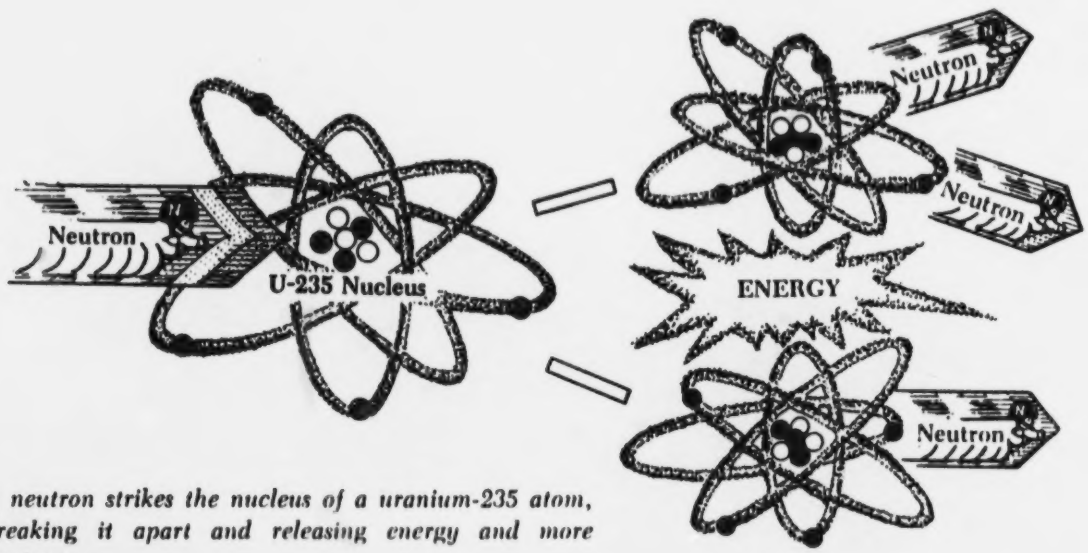
Considering the size of an atom, splitting it apart releases a lot of energy. But splitting one single atom does not produce enough heat to be really useful. We need to fission millions of atoms to get enough heat to do work.

How can we do that? The answer lies in the two or three neutrons that fly off when the first atom splits. If these neutrons hit other uranium-235 atoms, these atoms may also fission, each releasing heat and two or three more neutrons. Within seconds, millions of atoms can be fissioning, and with millions of atoms, we can get a lot of heat. This sequence of events--or chain of events--is called a *nuclear chain reaction.*

Keeping a chain reaction going is actually very difficult. This is because many of the neutrons that fly away from each fission will not hit another uranium atom's nucleus. If more are wasted than are produced by new fissions, the chain reaction will slow down and eventually stop.

The usable heat we get from a chain reaction comes mainly from the fission process. A small amount of heat is also produced as the neutrons and fission products bounce off neighboring atoms, producing heat by friction.

At a nuclear powerplant, uranium-235 is used as fuel. The heat produced by the fissioning of many millions of uranium-235 atoms is used to heat water, which produces steam. This steam turns turbines to generate electricity. The major difference between a nuclear powerplant and one that burns coal or oil is the way the heat to make steam is produced.



A neutron strikes the nucleus of a uranium-235 atom, breaking it apart and releasing energy and more neutrons.

Source: The Harnessed Atom, U.S. Department of Energy (DOE/NE-0072), U.S. Government Printing Office, Washington, D.C. 20402.

What is fusion?

In addition to fissioning, or splitting the atom, modern scientists are learning how to bring about another type of nuclear reaction called *fusion* (FYOO-zhən).

Fusion occurs when light isotopes of the element hydrogen join together (or fuse) to create a new atom and release a large amount of energy.

The isotopes of hydrogen to be used in fusion are called *deuterium* (dyu-TIR-ee-əm) and *tritium* (TRIT-ee-əm). They are driven together with tremendous force at incredibly high temperatures, producing an atom of the element helium, a neutron, and a lot of energy.

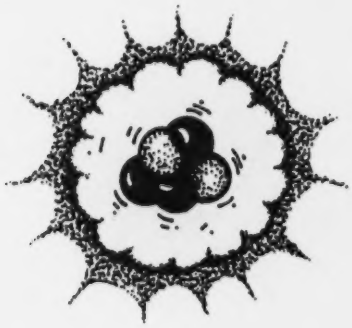
The energy of the Sun and stars is produced through fusion. Scientists are trying to build machines that can imitate the Sun to produce heat for powerplants. However, on the Sun, gravity holds atoms together so they can fuse. On Earth, scientists are trying to use magnetic fields to confine hydrogen isotopes for fusion.

Atoms can be forced together more easily at very high temperatures. The greatest challenge in producing fusion energy is to heat the hydrogen fuel to 100 million degrees Celsius (212 million degrees Fahrenheit) and confine it long enough for fusion to occur. Such temperatures are over six times hotter than the surface of the Sun.

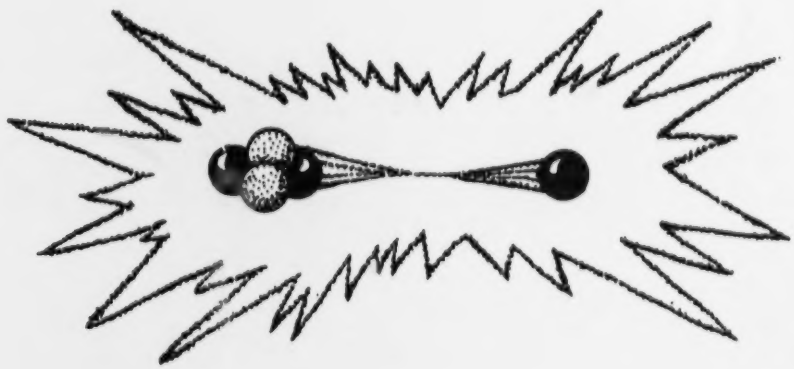
At high temperatures, hydrogen fuel becomes a *plasma* (PLAZ-mə). Plasma is similar to a gas, yet it differs slightly because electricity alters it and magnetism molds it.

Imagine how difficult it is to hold a plasma heated to 100 million degrees Celsius (212 million degrees Fahrenheit). One method being

Deuterium and tritium are joined,



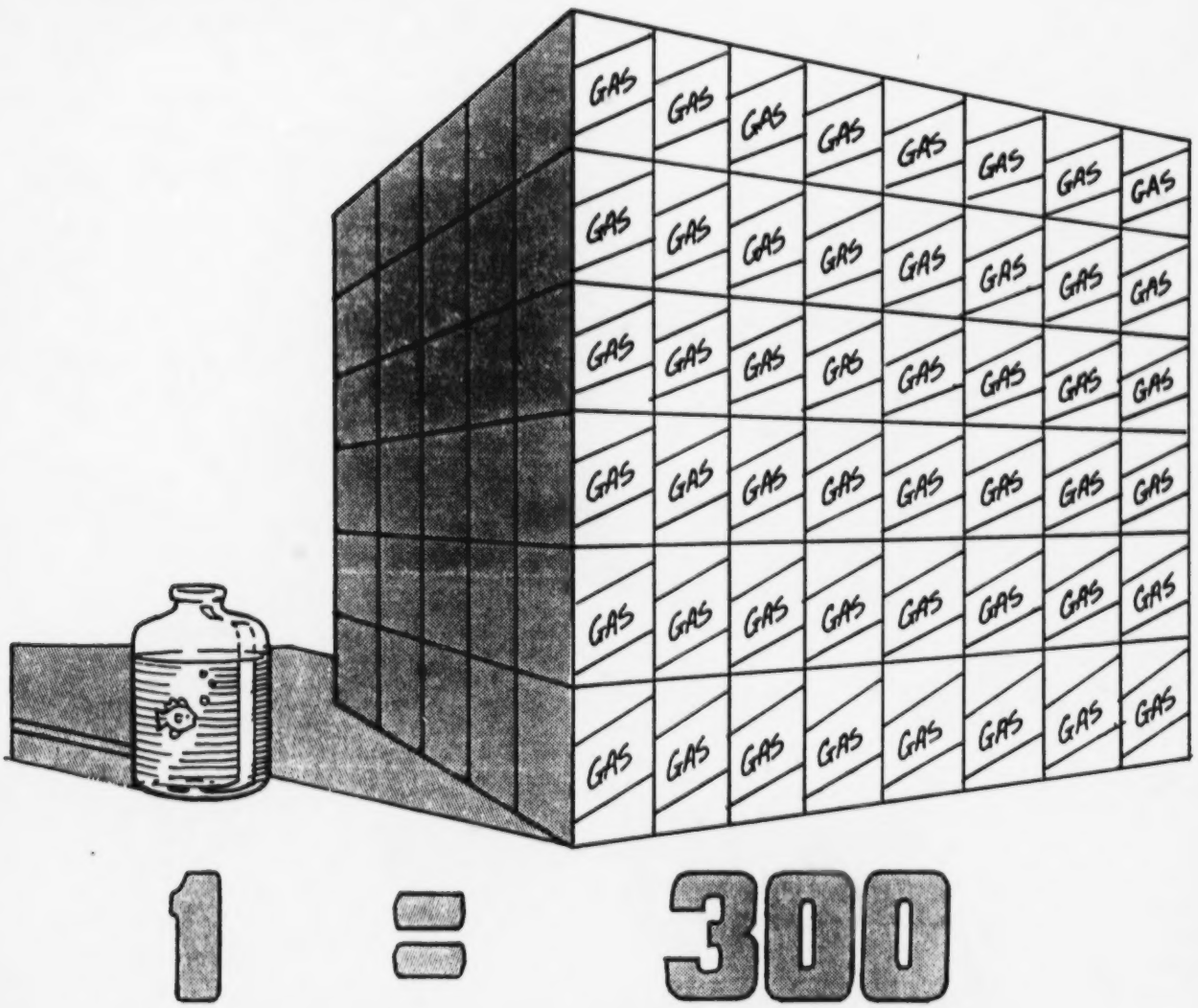
forming an unstable nucleus, and



producing an atom of helium, a neutron, and a lot of energy.

developed would use incredibly strong magnetic fields to keep the hot plasma away from container walls. In one type of fusion experiment, magnetic fields spin the plasma in a donut shape. Magnetic coils "squeeze" the plasma until atoms are forced together.

Fuel used for fusion is abundant and can be taken from sea water. One gallon of sea water contains enough hydrogen isotopes for fusion to equal the energy which would be released by burning 300 gallons of gasoline. It is expected that fusion could begin to contribute abundant, economical energy to our country in the 21st century, if research presently underway is successful. So far, scientists have been able to maintain a controlled, continuous fusion reaction for only fractions of a second.



If used in fusion, one gallon of sea water contains enough hydrogen isotopes to equal the energy that would be released by burning 300 gallons of gasoline.

REVIEW EXERCISE

A. Select the term that best fits the definition given.

_____ 1. nuclear reaction in which an atom is split apart

_____ 2. sequence of atoms fissioning and releasing neutrons that cause additional atoms to fission

_____ 3. particle of an atom that flies off when a uranium atom is split

_____ 4. type of atoms split apart in nuclear powerplant to produce heat

_____ 5. nuclear reaction in which two atoms are joined together

B. Indicate whether each statement is true (T) or false (F) by circling the correct letter. If the statement is false, correct it to make it true.

1. Fission occurs when the nuclei of certain atoms are hit by neutrons. T F
2. When fission occurs, energy is released as heat. T F
3. A nuclear chain reaction occurs when electrons from fissioning atoms hit other atoms. T F
4. In a nuclear reaction, the atom is changed. T F
5. Fusion takes place under conditions of extreme cold. T F
6. In a nuclear powerplant, fission is used to heat water to make steam. T F

C. Circle the letter of the best answer for each item.

1. In today's nuclear powerplants, the fuel used is _____.
   a. helium
   b. proton
   c. uranium
   d. tritium

2. Nuclear fusion uses _____ for fuel.
   a. petroleum
   b. hydrogen isotopes
   c. oxygen
   d. uranium

3. A uranium-235 atom splits when a(n) _____ hits its nucleus.
   a. atom
   b. proton
   c. electron
   d. neutron

(Continued on next page)

D. Label the following reactions as **chemical** or **nuclear**. Remember that in chemical reactions, atoms of various elements combine with one another to form molecules. In nuclear reactions, the atoms themselves change, often forming new elements.

_____ 1. An atom of sodium combines with an atom of chlorine to form a molecule of table salt.

_____ 2. A neutron is added to the nucleus of a uranium-235 atom, causing it to become unstable and split apart.

_____ 3. An atom of sulfur combines with two atoms of oxygen, forming a molecule of sulfur dioxide.

_____ 4. An atom of oxygen combines with two atoms of hydrogen to form a molecule of water.

_____ 5. Deuterium and tritium atoms are forced together, releasing energy, an atom of the element helium, and a neutron.

SIMULATION OF FISSION CHAIN REACTION

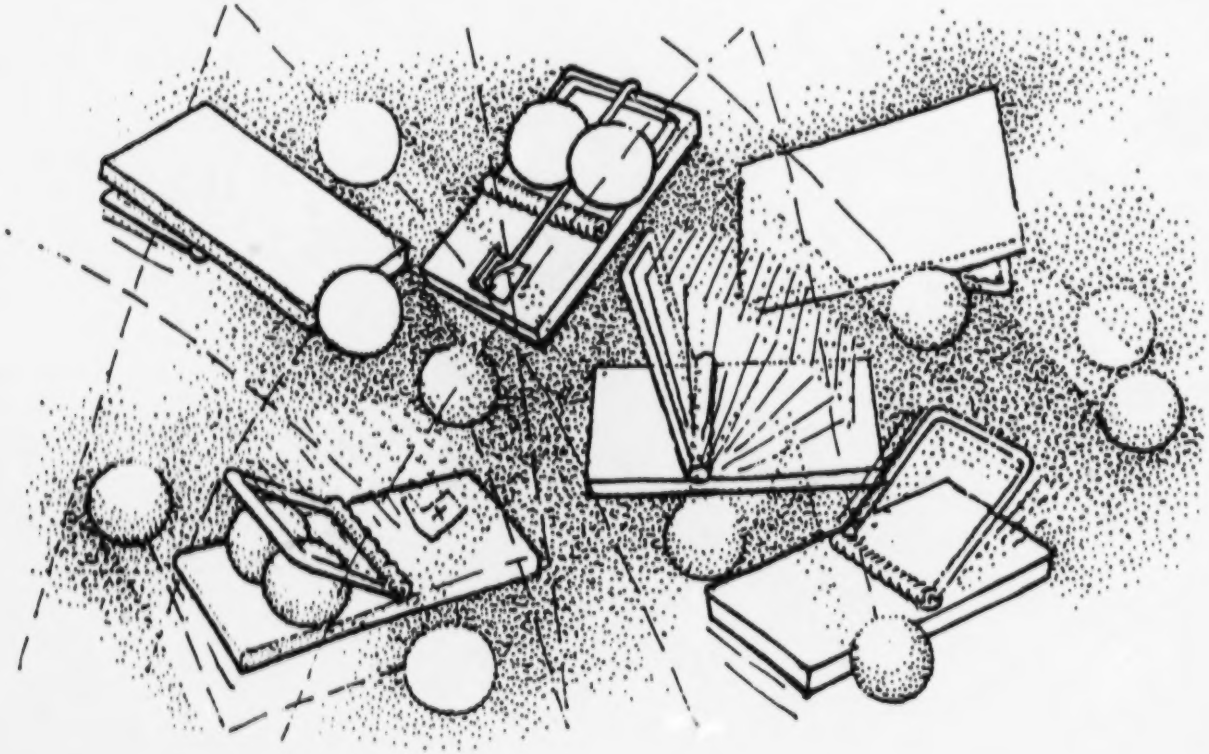
Materials

large box with transparent top or clear plastic for a cover
mousetraps (snap-spring type)
ping-pong balls
long-handled tongs

Directions:

Set the box where it can be easily viewed.
Set the mousetraps. Using the tongs, **carefully** place the traps in the bottom of the box.
Carefully place two ping-pong balls on **each trap**, using the tongs.
Move the cover in place.
Drop one ping-pong ball under the cover.

Note of Caution:
Because there is a danger that the mousetraps could go off accidentally, it is better if this demonstration is done by the teacher.



Topic: What is Nuclear Energy and How is it Produced?

Title: "The Physics of a Nuclear Explosion"

Source: Adapted by Ford Morishita, Rex Putnam High School, (North Clackamas School District), 4950 SE Roethe Road, Milwaukie, OR 97222, from Dialogue: A Teaching Guide To Nuclear Issues (Cambridge, MA: Educators for Social Responsibility, ©1982). Used with permission. Edited by David Stewart-Smith, Oregon Department of Energy.

Essential Learning Skills: 1.2 (a), 3.1 (a,d), 6.1 (c)

Suggested Grade Levels: 9-12

Suggested Time: 2 days

Suggested Course Content: Science (chemistry, physics, physical science)

Objective: To provide students with an understanding of the differences between conventional explosions (chemical reactions) and nuclear explosions (reactions between nuclei).

Materials: Handout "The Physics of a Nuclear Explosion" for each student; see Procedure (item 2) for material needed for demonstration.

Procedure:

1. Hand out the information packet titled "The Physics of a Nuclear Explosion" and ask students to read along as you review the information. Lecture notes have been provided for teacher use. (Teachers are encouraged to provide a copy of the lecture notes to students as an advanced organizer. This will aid in student note-taking.)

2. Conduct a class demonstration of a hydrogen chemical "bomb." The procedure for making the "bomb" is as follows:
   a. Pour into a 12 oz. pop bottle approximately 25-30 ml. of dilute hydrochloric acid.
   b. Place into the bottle 6-8 chunks (1 cm. diameter) of zinc.
   c. Put a balloon (5-6 inches) over the top of the bottle.
   d. Allow the balloon to become fully inflated, which will probably take 15 minutes (you may need to fill the balloon before the class begins.)
   e. Tie off the balloon. Make sure all students are at least 20 feet away, and keep the bottle completely away from the wood splint.
   f. Light the balloon.
   g. Discuss with students the chemistry and physics involved in the explosion.

Extending the Activity:

The sound you just heard is the result of a chemical reaction. You will agree that it was energetic. At the molecular level, it involved the exchange of electrons between atoms of hydrogen in the balloon and atoms of oxygen in the air around the balloon. The reaction can be shown in this way:

$2H_2$ + O_2 $\xrightarrow{T}$ $2H_2O$ + excess kinetic energy as
(hydrogen) (oxygen) (ignition) (water) heat and sound (boom).

It is important at this point to stress that this was a very common type of reaction, much like a car backfiring. It is qualitatively different from a nuclear explosion. A "hydrogen bomb" is device that is designed and built to result in a fusing of atomic nuclei. This reaction is much more difficult to achieve, but the resulting energy release is millions of times greater, atom-for-atom, than the simple chemical explosion with the balloon. In fact, a hydrogen fusion bomb uses the technology of the bombs that destroyed Hiroshima and Nagasaki as "blasting caps," to achieve the nuclear ignition of the hydrogen fuel.

Evaluation: Students will be able to explain the physics of a nuclear explosion and the differences with conventional chemical explosions.

1. Obtain pictures of the explosion of the blimp, the Von Hindenburg, a German airship that was filled with hydrogen. The point is that even such a spectacular display of pyrotechnics was small in comparison to an energy release from a hydrogen fusion weapon.

2. Obtain pictures of the U.S. testing of a hydrogen weapon in the atmosphere during the 1950s and early 60s to compare with the Von Hindenburg or other chemical explosions.

LECTURE NOTES: "The Physics of a Nuclear Reaction"
(Developed by Ford Morishita)

REVIEW MODEL OF THE ATOM

Electron

Nucleus (protons and neutrons)

TELL STUDENTS TO READ NUCLEAR REACTIONS IN HANDOUT

REVIEW ISOTOPES

HYDROGEN	DEUTERIUM	TRITIUM
1 PROTON	1 +PROTON 1 NEUTRON	1 PROTON + 2 NEUTRONS

URANIUM 235 and 238

fissionable (reactive)	non-fissionable (non-reactive)

U 235 is in enriched state, and U 238 is the natural state.
Plutonium is the heaviest atom with 90protons and 100neutrons.

DISCUSS THE DIFFERENCE BETWEEN FISSION AND FUSION
Have students read along as you review these reactions.

NOTE THAT 10 kg of Uranium is used in an average warhead.
100 Kg of Plutonium is used in an average warhead.

REVIEW THE DIAGRAMS FROM THE PACKET, ON HOW A FISSION AND FUSION WARHEAD WORKS. BE SURE TO TALK ABOUT CRITICAL MASS, AND WHY FUSION BOMBS ARE MORE POWERFUL THAN FISSION BOMBS.

DISCUSS HOW ELECTROMAGNETIC RADIATION IS PRODUCED, AND DISCERN THE DIFFERENCE BETWEEN ALPHA, BETA, AND GAMMA RADIATION.

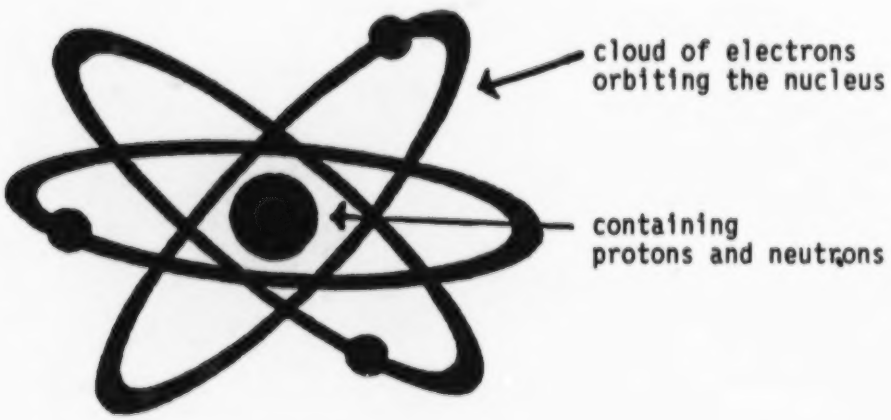
NOTE THAT THE HALF-LIFE OF PLUTONIUM IS 24,400 YEARS.
(Yes, they need to know what half-life means!!)

THE PHYSICS OF A NUCLEAR EXPLOSION

You have probably heard people talk about two kinds of weapons: nuclear weapons and conventional weapons. Nuclear weapons are designed to cause huge explosions. Some of them are bombs which could be dropped from aircraft just like conventional (non-nuclear) bombs; some are missiles, which could be launched into the air from ships or planes or from land to reach targets tens, hundreds, or thousands of miles away. Whether a bomb or a missile, however, any nuclear weapon carries at least one nuclear warhead -- something made from very special materials that can release enormous amounts of energy in a fraction of a second.

Much more energy can be released by these special materials than by the same weight of a conventional explosive like dynamite. Also, the effects of a nuclear explosion on people and buildings and the environment are very different from the effects of a conventional explosion. What makes them so different is that right down on the scale of atoms, very different things happen in each case. This lesson will try to explain enough about atomic physics for you to understand what happens in a nuclear explosion.

Figure 1: an atom



ATOMS

Everything is made up of atoms, and every atom contains both a nucleus and a cloud of electrons that fly around the nucleus. The nucleus itself contains two different types of particles: protons and neutrons (see Figure 1) Protons and neutrons are almost identical except for their electric charge. Some particles have an electric charge and some do not. This charge comes in two types which, just out of convenience, are called positive and negative. Protons have a positive charge, electrons have a negative charge, and neutrons are neutral; they have no charge.

Compared with protons and neutrons, electrons hardly weigh anything, so most of the weight of the atoms is in its nucleus. An atom is extremely small and light: about one hundredth of a millionth of a centimeter across, and a about a thousand million million times lighter than a kilogram in weight. (For comparison, a pea is about one centimeter across, and a quart of milk weighs approximately one kilogram.)

Electric charge is responsible for all sorts of things. For example, any two particles with the same type of charge -- either both positive or both negative -- repel each other; they push each other away. On the other hand, any two particles with opposite types of charge -- one positive and one negative -- attract each other. Electric current is the flow of charged particles. In the atom, electrons and protons are attracted to each other because they have opposite charge, and the electrons keep circling the nucleus instead of flying off at a tangent. The interaction between protons and electrons, or between like charges, is called the electrostatic force.

In a nucleus with more than one proton, the protons all repel each other very strongly, because they all have a positive charge. What keeps the protons bound together closely, in spite of this repulsion, is a very strong force called the nuclear force, which is greater than the electrostatic force.

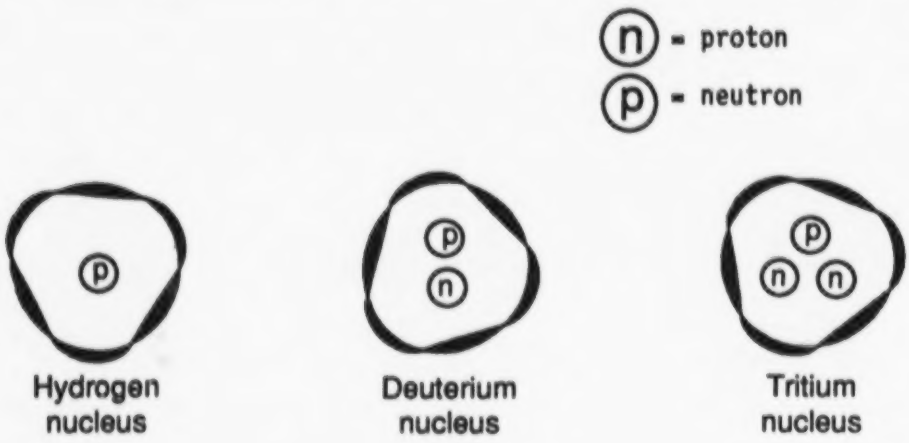
NUCLEAR REACTIONS

Things can happen to nuclei that release enormous amounts of energy. A nuclear explosion is much more powerful than the explosion of the same weight of dynamite, or TNT (TNT = trinitrotoluene, an explosive compound). That is because the energy released from these conventional or non-nuclear, explosions, is released in chemical reactions. The energy released in nuclear reaction is much greater, atom for atom, than the energy released in a chemical reaction, because the nuclei of the atoms, and the strong nuclear forces, are involved and not just the electrons.

The two types of nuclear reactions that can release energy are nuclear fission and nuclear fusion. Nuclear fission is what happens if one nucleus splits into two parts, and nuclear fusion is what happens if two nuclei are pushed together until they merge, or fuse. Different types of atoms have different numbers of neutrons and protons in their nuclei, and nuclear weapons are made from certain, very particular, types of atoms with nuclei that are easier to split or fuse than others.

There is a different name for each type of atom. Many names that you are probably familiar with -- like iron, oxygen, or carbon -- are simply the names of elements. An element is a substance in which all the atoms in it have the same number of protons. Elements can also have isotopes with the same number of protons, but a different number of neutrons, in the nucleus. For example, deuterium (often written D) is an isotope of the element hydrogen (H) because it has the same number of protons as hydrogen but a different number of neutrons. Deuterium has one neutron in its nucleus, while hydrogen has none. Another istotope of hydrogen is tritium (T); it has two neutrons in its nucleus and, like hydrogen, one proton (see figure 2). Hydrogen isotopes are used for nuclear fusion reactions.

Figure 2: Hydrogen and two istotopes



Some of the explosive materials used in nuclear weapons are made of especially heavy atoms called plutonium (Pu) and uranium (U). Plutonium and uranium atoms each have more than 90 protons and more than 100 neutrons in their nuclei. They are among the heaviest types of atoms that exist. Plutonium and uranium can be made to release nuclear energy by splitting, in nuclear fission reactions.

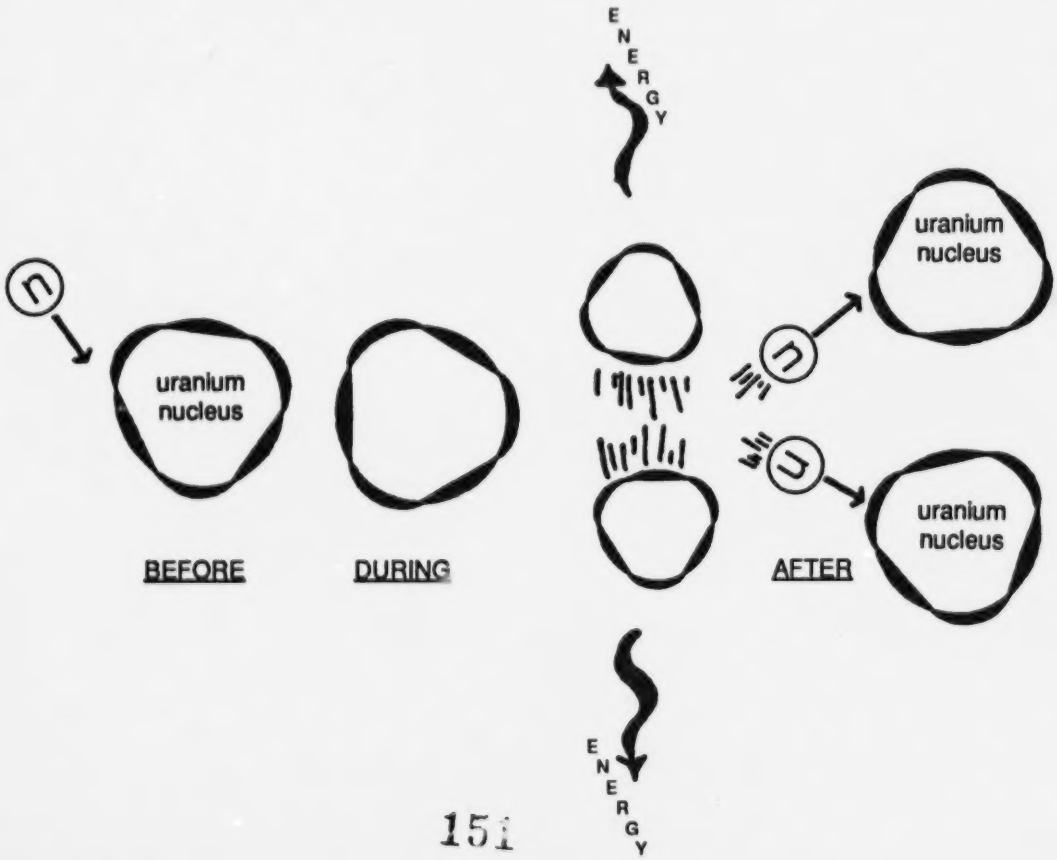
NUCLEAR FISSION

If one uranium nucleus splits, it releases a tiny fraction of a calorie (a unit to measure heat). But in a ball of U-235 2-1/4 inches across, there are 4.65×10^{24} atoms! That amount of uranium will release 35 trillion calories! Atom for atom, this is a million times more energy than the energy that a chemical reaction, such as burning coal, would release.

One important fact about the fission of uranium or plutonium is that, on average, two or three neutrons escape -- it's not a perfect split. These neutrons do not combine, but are free to move around and can trigger the fission of neighboring nuclei by colliding with them. The release of two or three neutrons can trigger the fission of two or three nuclei which will each release two or three more neutrons. These neutrons can cause the fission of more nuclei, and so on until a chain reaction builds up (see Figure 3). The key to using nuclear fission is to have enough plutonium or uranium to generate a huge chain reaction. About 10 kilograms of plutonium, and nearly 100 kilograms of uranium, are used in a typical nuclear warhead.

Figure 3: Fission

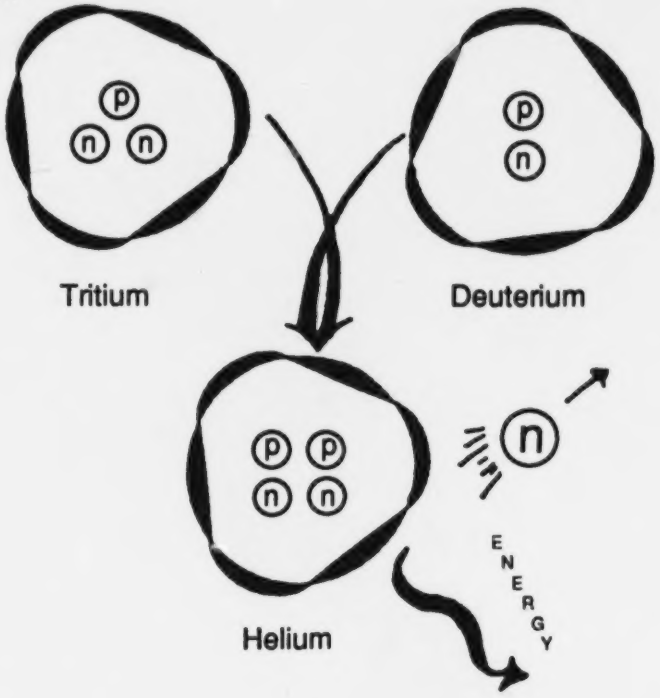
U-235 + n ----- Fragments + 2.4n + energy



NUCLEAR FUSION

In order for nuclear fusion to occur, the nuclei have to be pushed together at incredibly high speeds or at very high temperatures. In a fusion nuclear weapon, the deuterium and tritium isotopes get the speed they need to fuse from the heat of a fission explosion utilizing plutonium. One deuterium nucleus and one tritium nucleus fuse to form one helium nucleus, one extra neutron, and energy (see Figure 4). The same weight of fusion material will yield about ten times the energy as the same weight of fission material.

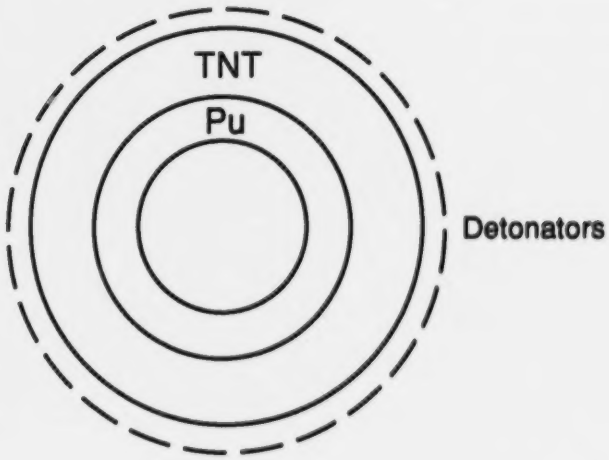
Figure 4: Fusion



ATOMIC (FISSION) BOMBS

The first atomic bomb test at Alamargordo, New Mexico and the Nagasaki bomb were of the implosion type (see Figure 5). A hollow sphere of plutonium was surrounded by a second sphere of conventional explosive (TNT). The entire outer sphere of TNT was detonated by an electrical pulse. The resulting explosion blasted inward from all sides at once, thus compressing the plutonium into a critical mass. A critical mass is that amount of fissionable material needed to start a chain reaction. (With less than a critical mass, the neutrons produced in the fission will not strike enough surrounding nuclei to keep the reaction going.)

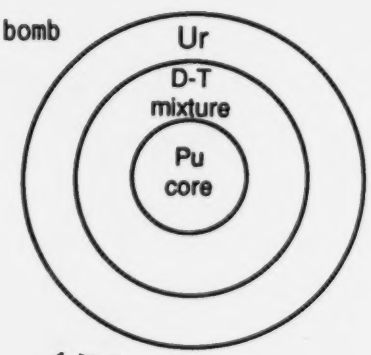
Figure 5: Atomic (fission) bomb



HYDROGEN (Fusion) BOMB

In a hydrogen bomb, a core of deuterium and tritium is heated and caused to fuse by the explosion of an atomic bomb. Most hydrogen bombs also include an outer shell of uranium around the deuterium-tritium core. The highly energetic neutrons that are released in the fusion process are absorbed by the uranium, cause its nuclei to fission, yielding extra energy. Thus, most hydrogen bombs are fission-fusion-fission devices (see Figure 6).

Figure 6: Hydrogen (fusion) bomb



Topic: Benefits and Limitations of Nuclear Technology: Economic, Societal and Ecological Issues

Title: "What are the Uses of Radiation?"

Source: Reprinted from The Harnessed Atom, U.S. Department of Energy, DOE/NE-0072 (for sale by the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402).

Essential Learning Skills: 1.2 (a or c), 2.1 (a,b,d), 2.2 (b), 3.1 (d), 6.5 (a)

Suggested Grade Levels: 6-9

Suggested Time: 1-2 class periods

Suggested Course Content: Science

Objectives:
A. To identify how radiation is used in medicine, science, industry and law enforcement.
B. To demonstrate radiography, one of the practical applications of radiation as a tool in science, medicine and industry.

Materials: Student Reader for each student, review exercise for each student, class activity "Radiography" (Polaroid 4 x 5 Land film packet type 57 3000 speed, trash container, radioactive source such as a lantern mantle, roller, book, and paper clips, pennies or other small objects.

Procedure:

1. Introduce vocabulary: activation analysis, carbon dating, CAT scanner, electroscope, hormones, labeling, radiography, radioactive isotopes, rubidium, scintillation counter.

2. Have students read the Student Reader.

3. Use the following questions for class discussion:
   a. How can we use radioactive isotopes to detect illness? (By replacing a few regular atoms with radioactive isotopes in substances like hormones, foods, or drugs, we are able to trace the path they take through our bodies as well as through other animals and plants. Instruments can be used to trace the isotopes through the body, or parts of the body, to find problems.)
   b. How can we use radiation to detect a weakness in the construction of a building? (X-rays can be used to see into many metals and machines to help us find flaws we cannot see on the outside. This is called radiography.)
   c. Have you ever had a broken bone x-rayed? Teeth x-rayed? How did this help the doctor or dentist treat you? (The doctor or dentist was able to see exactly what the problem was and then know how to treat it.)

d. Do you think the additional radiation received when people have medical x-rays, about 80 millirems/year, is worth the benefits they receive? (Answers will vary.)
e. Are there advantages to using radiation instead of pesticides to control pests, such as insects? (Radiation can be used to control pests by sterilizing male insects that have been raised in captivity and then released into the environment. These insects will not be able to produce offspring. Therefore, the number of insects will be reduced. This would help to reduce the need for adding chemicals to the environment.)

4. Assign and discuss the review exercise.

5. Have students conduct the radiography experiment either as a class, in small groups, or individually.

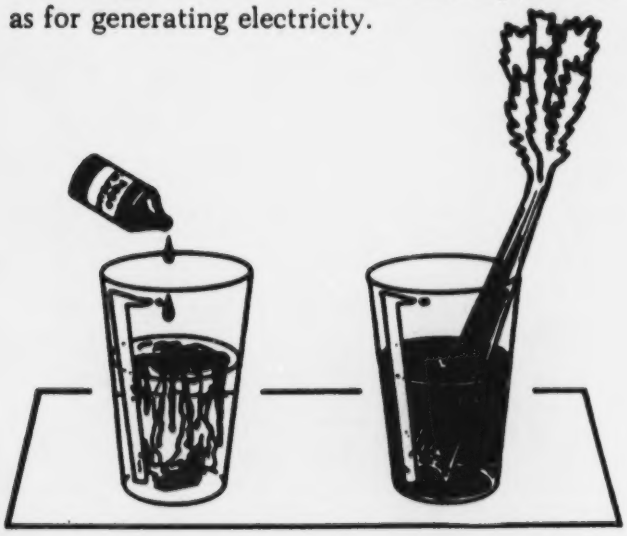
Extending the Lesson:

1. Invite a doctor or dentist to visit your class to discuss the benefits and risks of x-rays.
2. Have students make up a crime story in which the villain is caught by using carbon dating and activation analysis.

Evaluation: Review exercise, discussion questions, and follow-up on the "radiography" experiment should give evidence of student understanding of the objectives.

What are the uses of radiation?

Although scientists have only known about radiation since the 1890s, they have developed a wide variety of uses for this remarkable natural force. Today, to benefit mankind, radiation is used in science, medicine, and industry, as well as for generating electricity.



If you put food coloring in a glass of water, you make it easier to see the water. We could say you are *labeling* the water. If you then put a piece of celery in the glass of colored water and leave it overnight, you will be able to see how the celery takes up the colored water.

Scientists use *radioactive isotopes* in a similar way. They can label substances like *hormones*, foods, or drugs with small amounts of radioactive materials. Then, by using modern scientific instruments, scientists can see how people, animals, or plants use the labeled substances. The slight amount of added radioactivity does not change the way these materials behave. Instead, it provides a window that looks into the chemistry of life.

George de Hevesy was probably the first scientist to use a radioactive isotope to invisibly label a substance. While working as a scientist, de Hevesy ate his dinner at the boarding house where he lived. He thought his landlady saved the food he did not eat and served it again days later. To find out if this were true, the clever scientist placed a tiny bit of radioactive isotope on the remains of a meal. Several days later, he used an instrument called an *electroscope* to detect the radioactivity and proved that he was being served leftovers!

Of course, the electroscope de Hevesy used is quite crude by today's standards. Modern detection equipment can identify various types of radiation in extremely tiny amounts.

George de Hevesy used radioactive materials to prove he was being served leftovers.

De Hevesy suspected that he was being served leftovers.

He placed a small amount of radioactive isotope in his dinner.

Several days later he detected that the radioisotopes were in his food and proved he was being served leftovers.

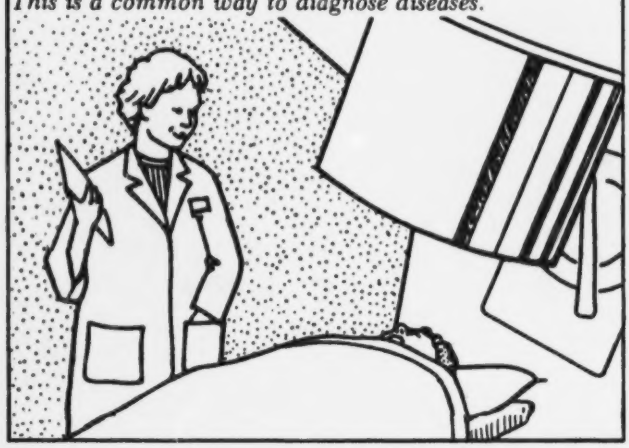
Source: The Harnessed Atom, U.S. Department of Energy (DOE/NE-0072), U.S. Government Printing Office, Washington, D.C. 20402.

How is radiation used in medicine?

X rays are a type of radiation that can pass through our skin. However, our bones are denser than our skin, so when x-rayed, bones and other dense materials cast shadows that can be detected on photographic film. The effect is similar to placing a pencil behind a piece of paper and holding them in front of a light. The shadow of the pencil is revealed because most light has enough energy to pass through the paper, while the denser pencil stops all the light. The difference is that we need film to see the x rays for us.

Doctors and dentists use x rays to see inside our bodies. This allows them to spot broken bones and tooth problems. X-ray machines have now been teamed with computers to make machines called *CAT scanners*, which can provide doctors with color TV pictures that show the shape of internal organs. Doctors can also give people slightly radioactive substances that are attracted to certain internal organs such as the pancreas, kidney, thyroid, liver, or brain. After one of these organs has been labeled with a radioactive isotope, a machine called a *scintillation* (sint-l-AA-shən) *counter* can be used to measure the radiation and provide an image of some of the many chemical reactions taking place within a specific organ. Medical machines like the ones mentioned above have changed the way doctors diagnose diseases and hold even greater promise for the future.

Doctors and dentists use x rays to see inside our bodies. This is a common way to diagnose diseases.



Doctors have also learned that radiation is more likely to kill cancerous cells than normal cells. As a result, radiation is often used to treat certain types of cancer.

How is radiation used in science?

Radiation is used in science in a surprising number of ways. Just as doctors can label substances inside people's bodies, scientists can label substances that pass through plants, animals, or our world. This allows us to study such things as the paths that different types of air and water pollution take through the environment. It has helped us learn more about a wide variety of things, such as what types of soil different plants need in order to grow, the size of newly discovered oil fields, and the track of ocean currents.

Scientists also use radioactive substances to find the age of ancient objects. In the upper reaches of our atmosphere, cosmic rays hit atoms of nitrogen and form a naturally radioactive isotope called carbon-14. Carbon is found in all living things, and a small percent of this carbon is carbon-14. When a plant or animal dies, it no longer takes in new carbon and the carbon-14 it contains begins the process of radioactive decay. However, new isotopes of carbon-14 continue to be formed in our atmosphere, and after a few years the percent of radioactivity in an old object is less than it is in a newer one. By measuring this difference scientists are able to determine how old certain objects are. This process is called *carbon dating*.

Recently, we have learned to study the decay chains of elements such as uranium,

rubidium (ru-BID-ee-əm), and potassium in order to date much older objects such as mountain ranges and moon rocks. Scientists also monitor the cosmic radiation that comes to Earth in order to learn more about how the universe was formed and what it is like in the depths of outer space.

How is radiation used to solve crimes?

You already know that detectives often search the scene of a crime for traces of paint, glass, hair, gunpowder, or even blood. But you may not know that after such evidence is collected, it is often exposed to radiation and then analyzed to find out its exact makeup. Radiation can activate some of the elements in most materials by adding neutrons to their nuclei. This makes certain elements in the sample slightly radioactive. Scientists are then able to read the exact chemical signatures of these substances. This is called *activation analysis*, and it is precise enough to tell if a single hair found at the scene of a crime came from a certain person. Activation analysis is also used to find out the chemical makeup of materials when scientists only have small samples, as well as to prove that older works of art are not made of modern materials.

How is radiation used in industry?

Radiation can kill germs without harming the items that are being disinfected and without making them radioactive. When treated with radiation, foods take much longer to spoil, and medical equipment such as bandages, hypodermic syringes, and surgical instruments don't have to be exposed to toxic chemicals or extreme heat. Although today we use chlorine, which is toxic and difficult to handle, in the future we may use radiation to disinfect our drinking water and even kill all the germs in our sewage.

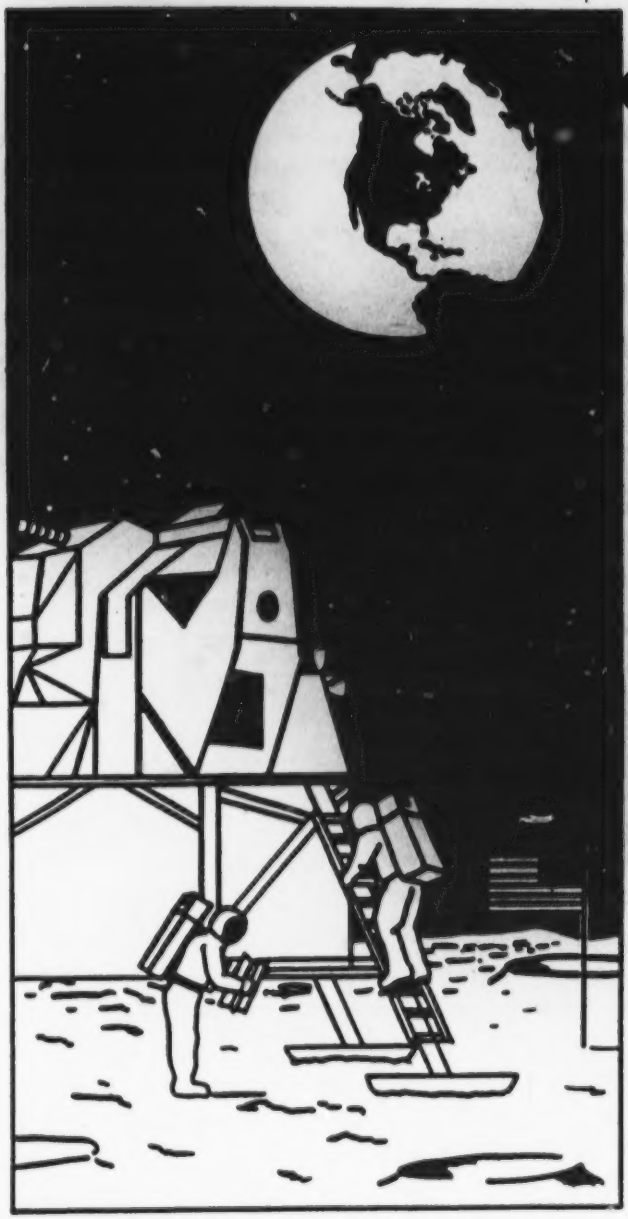
Our agricultural industry makes use of radiation to improve food production. Plant seeds have been exposed to radiation in order to bring about new and better types of plants. Many of our modern, fast-growing, and disease-resistant farm plants came from seeds that scientists changed with radiation. Beyond making stronger plants, radiation can also be used to help control insects. Thousands of male insects can be raised in a lab, treated with radiation, and then set free to mate in an area where that species of insects is a problem. Because the radiation makes them unable to produce offspring, the insect population shrinks. This use of radiation to control harmful insects decreases the use of pesticides, which also kill helpful insects.

Decreasing the use of pesticides saves helpful insects.

Many modern machines rely on radioactive materials to help control the thickness of plastics, paper, foil, paint, and many coatings such as the glue on tape or the print on paper. Engineers use a source of radioactive material that gives off a standard amount of radiation. Then they measure the amount of radiation that is stopped by the proper thickness of the material they are producing. If more radiation is measured, the machine detects that the material is becoming too thin. If less radiation is measured, the machine detects that the material is becoming too thick. In this way materials can be monitored without being touched. A similar system can be used to fill cartons and boxes. When a carton is filled to the proper level, more shielding is placed between the radioactive source and the sensor. When this happens, the sensor signals the machine to stop filling.

In addition, radiation in the form of x rays may be used to check the quality of many things we build. This is called *radiography* (ray-dee-OG-rə-fee), and it helps us to find invisible defects within many types of metals and machines. Radiography can also be used to check such things as the flow of oil in sealed engines, the blending of different types of metals, or the rate and way various materials wear out.

Radioactive materials provide fuel to make electricity for our cities, farms, and towns. Today, more than 80 nuclear powerplants supply about 13 percent of our electricity. Beyond this, because only small amounts of radioactive substances are needed to produce a lot of energy, they are used in pacemakers as well as for lights on remote airplane runways and ocean buoys. Radioactive materials are also used in our space program to provide power to space crafts traveling beyond our solar system. Such materials were also used during our missions to the moon.



Radioactive materials were used during our missions to the moon to provide backup electricity.

We are finding more uses for radioactive materials all the time. They take us back to ancient civilizations and into the depths of outer space, and they improve the quality of our lives with better medical techniques, energy sources for producing electricity, and many powerful tools for science and industry.

REVIEW EXERCISE

A. Select the term that best fits the blank space.

1. Our bones are _____ than our skin.
2. Doctors and dentists use _____ to see inside our bodies.
3. We can use radioactive materials to _____ different substances and then see where they go in our bodies or our environment.
4. We use radioactive materials to help us generate _____.
5. _____ helps us find invisible defects in metal objects.
6. Carbon _____ helps us find the age of artifacts.
7. Devices called _____ help people's hearts keep beating.

B. Indicate whether each statement is true (T) or false (F) by circling the correct letter. If the statement is false, correct it to make it true.

1. Dentists use x rays to polish people's teeth. T F
2. More than 80 nuclear powerplants are currently operating in America. T F
3. Activation analysis helps police solve crimes. T F
4. George de Hevesy discovered celery in his leftovers. T F
5. Radiation can be used to determine the correct volume to fill cartons and boxes. T F

C. List four uses for x rays.

1. _____
2. _____
3. _____
4. _____

D. Tell how the following segments of our society use radioactive materials.

construction _____

archaeology _____

agriculture _____

medicine _____

electric utilities _____

Which of these uses occur in your community ?_____
List any additional uses of radioactive materials in your community.

_____

_____

_____

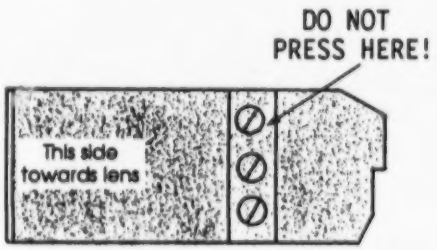
RADIOGRAPHY

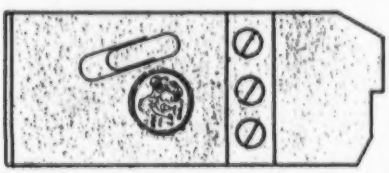
Can you make a photograph using radiation?

This experiment demonstrates one of the many practical applications of radiation as a tool in science, medicine, and industry.

Materials	
trash container	roller
Polaroid 4x5 Land film (packet type 57), 3000 speed	book
radioactive source, such as a lantern mantle	paper clips
	penny or other small objects

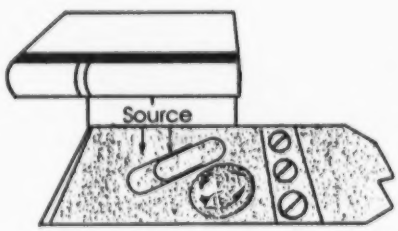
1. Place a film square on a table with side reading "This side towards lens" facing up. Be sure you do not push down on the area indicated.

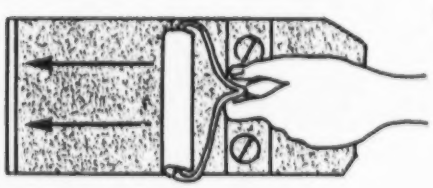




2. Arrange the paper clips and penny on the film square.

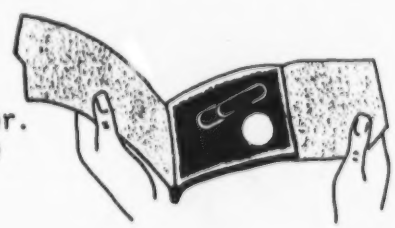
3. Now place the source on top of the objects and hold in place with a book. If you use a lantern mantle, fold it in half, and then in half again. Do not mash the section indicating "Do not press here." Expose for at least 30 minutes. For best results, leave overnight.





4. Be very careful developing your photo. Do not touch the chemicals. Develop your photo by starting just behind the section indicating "Do not press here" and firmly roll the roller over the film once. This will release the developing fluid and spread it evenly over the film.

5. Peel back the paper. Do not touch the chemicals. Immediately discard the paper in the trash container. Look carefully at your photograph. Can you see the objects?



Topic: **Benefits and Limitations of Nuclear Technology: Economic, Societal and Environmental**

Title: **"Investigations into the Benefits and Problems Resulting from the Use of Energy"**

Source: Reprinted with minor changes from Nuclear Age Issues - A Teacher's Resource Guide, Los Angeles Unified School District, Office of Instruction, Publication No. x-127, ©1987, pp. 62-64. Reprinted with permission.

Essential Learning Skills: 1.6 (b), 2.3 (d.g), 3.1 (a,e,f), 4.2 (b), 5.1 (c,d), 5.2 (b), 5.3 (a,b), 5.4 (a,b,c), 5.6 (a-e), 5.7 (a-c)

Suggested Grade Levels: 5-8

Suggested Time: 3 days

Suggested Course Content: Science, social studies, English language arts, arts (Extending the Lesson)

Objectives:

A. To identify several areas of societal and environmental concern which relate to the production of energy or use of energy sources.

B. To interview or survey adults at home and at school about their views on these areas of environmental concern and summarize the survey in graph form.

C. To write to environmental agencies, energy agencies and groups (DEQ, Health Department, etc.) requesting information and to use this information to make posters illustrating the viewpoints of the various groups (Extending the Lesson)

Procedure:

1. Divide the class into groups. Have each group compose five questions which evaluate the positive and negative effects on people and the environment of a particular energy source. (For example two groups might do fossil fuel, two nuclear, one solar, one wind, etc.)

2. As each group presents its questions to the rest of the class, students should refine the questions with teacher assistance and create a summary of about 30 questions requiring yes, no, or very brief answers.

3. After the teacher types up and duplicates the questionnaire, students should interview two adults in their family and one or two school staff members. (The teachers may wish to assign these and should request assistance from school staff members ahead of time. If the school is small, the teacher may wish to assign two students to one school staff member.)

4. Use the overhead projector to tally responses gathered by students. Discuss these responses as a class. Begin graphing the results in bar graph form, using the overhead projector to demonstrate. Students should complete the graph by themselves. For younger students, call them up to the projector to complete one question at a time of the graphed results to make sure they understand the graphing process.

5. Have the students summarize the survey in one paragraph either individually or as a class. As a class activity, students suggest a topic sentence, detail sentences, and a summary sentence. The teacher writes each sentence on the board after discussion and class consensus.

6. Ask the class to suggest a way in which they could incorporate their summary(s) of the survey into a letter to a private energy generating company about its industry and its problems. Review proper business letter format, then write a sample letter as a class or in small groups.

Extending the Lesson:

1. Writing to an environmental agency or group for information.
   a. Each student or small group is given (or asked to research) the name and address of an agency or group which may provide information that relates to the topic. The student(s) should compose a letter telling about the summary of the survey and requesting information from the agency/group viewpoint.

   b. Once the letter has been written correctly and reviewed, it should be mailed. When students receive a response, they can create a poster which expresses the opinions found in the response.

Evaluation: Have students write a summary of what they feel may be the benefits and possible harmful effects to people and the environment of using nuclear energy or fossil fuels to meet our energy demands.

Topic: **Benefits and Limitations of Nuclear Technology: Economic, Societal, Environmental**

Title: **"Discovering and Evaluating the Many Uses of Nuclear Energy"**

Source: Reprinted with minor changes from Nuclear Age Issues - A Teacher's Resource Guide, Los Angeles Unified School District, Office of Instruction, Publication No. X-127, ©1987, pp. 106-109. Reprinted with permission.

Essential Learning Skills: 2.2 (a,d), 3.1 (a,b); 4.1 (c); 4.2 (a); 6.1 (a,b), 6.3 (a-g); 6.4 (d); 6.5 (a,b); 6.6 (b); 7.2 (a-c)

Suggested Grade Levels: 8-12

Suggested Time: Varies depending on number and type of activities used. (Minimum of one day for background information on both objectives.)

Suggested Course Content: Science, social studies, vocational education

Objectives:

A. To develop an understanding that nuclear energy has both positive and negative aspects.
B. To develop an understanding of the environmental concerns about nuclear waste.

Procedure:

1. Provide students with background information on the positive and negative aspects of nuclear energy either as a handout or in a lecture/note-taking format (background information provided).

2. Engage students in one or more of the following activities:
   a. **Investigating Energy Alternatives:** There are commercially available microcomputer programs available that involve students in a simulation of energy resource management. Examples include: Three Mile Island (Muse) and Energy Search (McGraw Hill)
   b. **Describing Nuclear Power Plants:** Construct a model of a nuclear reactor using boxes, cans, straws, and wire. Label and discuss each part. Explain the steps in the conversion of nuclear energy to electrical energy. Compare a nuclear power plant to a fossil-fuel power plant and to a hydroelectric plant.
   c. **Investigating the Medical Uses of Radioactive Substances:** Present students with a list of medical uses of radioactive substances and assign them the task of researching and writing a report on one specific use of nuclear medicine. In addition, a guest speaker from a local hospital who works with radioactive substances (e.g., an x-ray technician, physician, nurse) may be invited to address the students.
   d. **Evaluating the Pros and Cons of Radioactive Substances:** Divide the class into two groups. Assign one group the task of researching the potential benefits of radioactive substances and the other group the potential harmful effects. Each group should prepare a presentation, oral or written, for the whole class.

e. **Investigating Beneficial Uses of Nuclear Radiation:** Use reference books in the library to prepare a report on one or more beneficial uses of nuclear radiation. Examples can be found in the fields of medicine, agriculture, hydrology, and pest control.
f. **Using Radiation to Cure Disease:** Make a list of diseases in which radiation is used as a treatment or cure (e.g., cancer), and have students research one or more of these diseases and the involvement of radiation in the treatment.
g. **Discussion Questions:** 1) You are a physician who recently discovered a small tumor in a patient undergoing a routine examination. The patient has not complained of any health problems. What are you going to tell your patient? 2) You are one of a distinguished group of scientists who have been invited by the President of the United States to serve on a nuclear energy ethics panel. What issues should the panel consider concerning the potential benefits and harmful effects of a nuclear plant in which some defects have just recently been discovered in the cooling system? What steps are you going to take, if any? Discuss with the students how a decision is made when both positive and harmful effects are to be considered.

3. Provide students with background information on the issue of nuclear waste, as a handout or in a lecture/note-taking format.

4. Engage students in one or more of the following activities:
   a. Compare the advantages and disadvantages of nuclear energy with the energy that is produced using water power or fossil fuels such as coal, oil, and natural gas. Alternative energy resources, e.g., geothermal, solar, wind, and tidal, can also be included in this comparison. The comparison can be made in a written report by students or in class discussion.
   b. Discussion Questions: The federal government wants to bury radioactive wastes near where you live. What is your opinion on the issue? What steps should be taken before making the decision to allow or prohibit such a disposal site?
   c. Problem Solving: Use a problem solving model to examine the issue of nuclear waste. Encourage students to generate as many creative solutions as possible prior to evaluation.

Evaluation: Have students describe several positive and negative aspects of nuclear energy. Have students explain why nuclear waste is a crucial environmental issue.

Positive and Negative Aspects of Nuclear Energy

BACKGROUND INFORMATION: Nuclear energy has both positive and negative aspects. The positive include the following: First, the heat produced in fission reactions has been harnessed to produce electricity. Nuclear reactors produce no particulate air pollution. Only a very small amount of nuclear fuel is needed to power a reactor. Second, the radiation from several elements has been used in various medical fields. Radium and cobalt, both radioactive elements, are widely used in the treatment of cancer. Heart patients use nuclear batteries in their pacemakers to ensure long-lasting and reliable service. Third, radioactive carbon that exists in all living things can be measured and used to calculate the age of ancient organisms, and uranium is used to measure the age of ancient rocks. Fourth, radiation is used to control pests. Scientists use radiation to sterilize male insects. When they mate with the females, no offspring are produced, and therefore the pest population is decreased or wiped out. Fifth, radioactive tracers that contain a very low level of radiation are injected into living organisms to trace the movement of substances through the body for locating the sources of illness. Specifically, an injection of a radioactive compound may be given to locate problems within the brain or within the circulatory system leading to and from the brain. A scanner or gamma camera is used to scan the brain and follow the movement of the radioactive compound. This process is called a brain scan. Physicians also use radioactive substances to study the thyroid gland and determine how well the thyroid gland is working. Lung scans, cardiac imaging, liver scans, and bone scans are other helpful tests used in the medical field. Sixth, manufacturing plants use radioactive materials to gauge the thickness of many materials, to test products, and to examine the inner structure of building materials. Seventh, city water departments and large oil companies use radioactive tracers to measure pipeline leaks and the flow of materials in the pipeline. Eighth, highway construction companies use these substances to measure the density and moisture in the soil used for road building. Finally, radiation is being used in agricultural research to develop seeds that produce greater quantities of food and that are resistant to disease and insects.

The negative aspects of nuclear energy include the following: First, nuclear energy can be harnessed into military weapons that have devastating potential. There is a growing concern that some governments will misuse nuclear fuels and produce bombs and other nuclear weapons instead of using the fuel for peaceful purposes. Second, radiation can be harmful to living organisms. Radiation sickness can result in anemia, loss of hair, internal bleeding, burns, and even cancer or death. Third, radioactive wastes have to be disposed when they are used up. This involves finding suitable containers and storage places for the wastes. The radioactive waste produced in nuclear medicine includes the needles, syringes, swabs, and gloves used while administering various radioactive compounds. The radioactive materials themselves must be stored in special containers until they are removed from the hospital or office. Fourth, the nuclear reactions that take place in power plants have to be carefully monitored by the employees. There have been some problems with the very sophisticated equipment necessary to maintain control over the fission reactions. The result has been that many nuclear power plants are

operating at far less than maximum capacity and in some cases, have had to be closed down for extensive repairs. Accidents at nuclear power plants have the potential for long-term genetic and other damage. The accident at the Chernobyl (U.S.S.R.) plant which was poorly designed and constructed has caused many deaths and injuries.

NUCLEAR WASTE: A CRUCIAL ISSUE

BACKGROUND INFORMATION: The fission of uranium atoms creates the heat energy that is used to generate electricity in nuclear power plants. After three or four years, nuclear fuel is spent, and it is removed from the reactor and stored in an on-site cooling tank, eventually to be either reprocessed into more usable fuel or disposed of permanently. There are two broad categories of nuclear waste: defense-related and commercial. There are three kinds of waste connected with commercial uses of nuclear fuels. There is "spent fuel" which is highly radioactive; this is the fuel that is removed from a reactor after three or four years. Second, there are low-level wastes, such as filters, rags, tools, and clothing used in plant maintenance and in fuel fabrication. Third, there are the "uranium tailings" which are piles of radioactive residue left over after uranium is mined.

The greatest concern has been expressed over the "spent fuel" and its storage and disposal. Spent fuel is initially stored under water in on-site pools for a period of about six months. After that, the spent fuel is removed from the site to other storage pools for reprocessing or permanent disposal. The water in the cooling pools eventually must also be disposed of. Currently, the spent fuel that has been permanently disposed of is stored in lead containers in stable geologic formations 2000 to 3000 feet deep. It takes several thousand years for the radioactive material to drop to its naturally occurring level. The greatest concerns center around the location of the storage sites. Several states currently have these spent fuel burial sites, and public concern is considerable over the potential damage from radiation caused by leakage in the containers. The total amount of this waste material is less than a ton for a full year's operation of a major power plant -- typically one thousand megawatts capacity. In terms of long range poisoning capability, this will be far less than from a similar quantity of arsenic used for pesticides with an infinite life. Arsenic will not decay like nuclear waste, but retains its poison potential indefinitely. In the past several years there has been a curtailment of nuclear processing and the spent fuel elements have simply been retained in the reactor cooling tanks. Ironically, the United States has imported radioactive material to fill its needs for nuclear medicine, food processing, and other industrial processes. Realistically, however, the issue of nuclear waste in itself is a significant argument against the proliferation of nuclear power plants. This issue is relative to other combustion processes which produce thousands of tons of waste per day for a similar power output. Typically, the total amount of radioactivity from natural sources in a coal power plant are about the same as that produced in a nuclear power plant of the same total power output, providing no accident or other breakdown occurs in the latter.

UNIT FIVE LESSONS

UNDERSTANDING WEAPONS ISSUES

The History and Changing Nature of Armed Conflict--
"What is Power?" 185
The History of the Nuclear Arms Race--
"Displaying Information on the Nuclear Arms Race" 189
"Deciding to Use the Atomic Bomb, 1945" 193
The Effect of the Arms Race on Local, National and International Economics--
"Military Spending by Other Countries" 201
The Debate: Potential Effects and Dangers of The Use of Modern Weapons--
"Civil Defense Debate" 209
"Nuclear Winter: Myth or Reality?" 213
"The Characteristics of a Nuclear Explosion" 215
Preventing War in an Armed World: Strategies and Institutions--
"The Strategic Defense Initiative ('Star Wars')" 219
"The Strategic Defense Initiative (Women's International League for Peace and Freedom) 221
Footnotes for Strategic Defense Initiative 228
"The Strategic Defense Initiative (Citizen's Defense Education Committee)" 231

UNIT 5: UNDERSTANDING WEAPONS ISSUES

Do students know the history of armed conflict and modern armaments? Do they know the key events, essential issues and principal debates pertaining to these weapons?

The bulk of the nuclear age education curriculum (Units 1, 2 and 3) should be considered for inclusion at all grade levels, subjects and activities. This unit--and, to a degree, Unit 4-- should occupy a much narrower, but very significant place in the curriculum. For reasons similar to education concerning dangerous diseases or drug abuse, students should learn, at appropriate times, information about modern weapons of mass destruction.

Inclusion of this unit in the school curriculum should be considered and planned with special care. Some of the information it contains may lead to strong feelings in students, including fear, pessimism and anger. Awareness of what nuclear weapons can do may be very upsetting. It should be remembered, however, that many topics in this unit are <u>not</u> so potentially frightening (e.g., the history of the arms race, theories on the prevention of nuclear war, characteristics and history of armed conflict). Information in the curriculum's Introduction should aid school communities in the processes of decision-making, planning and preparation.

In spite of the potential for several topics to upset students, cause controversy and raise questions of balanced presentation, it is perhaps a greater danger that this unit will not be taught at all. The facts and issues surrounding nuclear weapons stand as important, undeniable parts of present-day life. Many young people are concerned about nuclear weapons and look to their teachers for information and hope. Even as teachers present Units 1, 2 and 3 as hopeful, constructive foundations for learning, they should consider the necessity to present an apparently dangerous situation as clearly and honestly as possible.

Specific subject areas most appropriate for presenting examples from this unit include history, social studies, the sciences and health. English language arts and arts courses may play significant supplementary roles.

Suggesting these subject areas may seem to imply that only secondary school teachers in those disciplines ought to study the example lessons in Unit 5. However, because of the subject matter, it is important for other teacher to do so as well. Students raise questions about nuclear weapons and related issues informally, often with great curiosity and concern, in many places other than the classes noted above. This has happened as early as the second grade and becomes much more common in the middle school and high school years. Therefore, it is strongly recommended that all educators study examples to help them prepare appropriate responses for times when students raise nuclear weapons issues unexpectedly. In addition, many adults, including educators, hesitate to address children's fears about nuclear arms or to teach certain topics because they do not feel adequately prepared to do so. The examples and bibliography presented in this curriculum offer resources for anyone who needs such preparation.

Topic: **The History and Changing Nature of Armed Conflict**

Title **"What is Power?"**

Source: Adapted from Approaches For Teaching About the Nuclear Arms Race: A Guide for High School Teachers, Milwaukee Public Schools, Milwaukee, Wisconsin, ©1985, pages WP 5, #4-1. Used with permission.

Essential Learning Skills: 2.3 (d), 3.1 (a,b,f,h), 6.5 (b)

Suggested Grade Levels: 9-12

Suggested Time: 2 days

Suggested Course Content: Social studies

Objectives:

A. To formulate a group definition of power.
B. To identify and analyze how the forces and elements that determine power as an ingredient of war have changed over time.
C. To formulate generalizations related to the changing nature of armed conflict.

Procedure:

1. Have students work in small groups (two to three students) to formulate a definition of power. Clarify that students should think in terms of a powerful person or nation, as opposed to a source of energy. Have students complete the sentence "Power is...," and, if necessary, tell them that the next word in the sentence must be a noun because the word they are defining is a noun. Do not accept definitions phrased as "Power is like when..." Allow approximately ten minutes for students to prepare their definitions, then ask each group to write its definition on the board. Adopt or modify the definitions so that there is one definition on which all students can agree. Tell students that for the next day and a half they will be examining power as an ingredient in war. Specifically, they will be identifying and analyzing how the forces and elements that determine power have changed over time.

2. Discuss the positive and negative connotations of the concept "power." For example, power can be viewed as coercive, oppressive and manipulative. But it can also serve to bring about needed change and/or secure an individual, group or country from threat or harm. Students should understand that "power," in and of itself, is neither negative or positive.

3. Handout the essay "What is Power?" Have students read the first paragraph and respond to Discussion Question 1 (place the items generated in chronological order on the board). Ask: "What general statements can be made about the evolution of weapons?" (Possible answers: more complex technology; need for skilled fighters; development of both offensive and defensive weapons; increased killing capacity; less hand-to-hand combat; long range capabilities). Have

students formulate one or more generalizations regarding the evolution of weapons.

Have students read the second paragraph of the essay and respond to Discussion Questions 2 and 3. Finally, have students formulate a generalization related to the components upon which international military power is measured today. How might this change in the future?

Extending the Lesson:

Have students identify a list of powerful people in history. Divide students into small groups to consider how these individuals used their power. Have each group discuss and record:

A. Which of these powerful people were popular in their day? Which were unpopular? Why?
B. Which of these people undertook actions utilizing power that seem justified in the light of history?
C. Why have some argued that "power" in itself is neither good nor bad?

Evaluation: Have students provide examples to support the generalizations they have created.

Have students identify and explain how the forces and elements upon which power has been based have changed over time.

ESSAY

One ingredient of all conflicts, past and present, is POWER. In earliest times some people were physically stronger than others. If two people fought, the strongest had the most power. But it did not take people long to realize that there were ways to augment their power. Tools or weapons often gave one fighter more power than another. The stick or club was probably the first weapon used to gain power. But over the years a host of weapons was developed and used by humans.

As time passed power was no longer measured in terms of individuals or small groups. Instead international military power was measured in terms of the number of troops or number and quality of weapons leaders had at their disposal. Power also began to be measured in terms of the land (natural resources) or civilian workers (who might make tools and weapons) available to a leader or group.

Discussion Questions:

1. How have the weapons of warfare evolved over the years? (Place the items in chronological order on the chalkboard.)
2. How can the amount of land or number of civilian workers enhance a nation's power?
3. How has the new concept of power changed the nature of targets to be attacked in a war?
4. Can power be used to preserve peace? Explain.

Topic: **The History of the Nuclear Arms Race**

Title: **"Displaying Information on the Nuclear Arms Race"**

Source: Reprinted with minor changes from Nuclear Age Issues: A Teacher's Resource Guide, Los Angeles Unified School District, Office of Instruction, Publication No. X-127, ©1987, pp. 142-145. Reprinted with permission. Information on Objective B reprinted with permission from The Social Studies Basic Skills Connection, Missouri Department of Education, 1982.

Essential Learning Skills: 1.4 (a,b), 1.5 (d), 1.6 (b,c), 2.2 (a,d), 3.1 (a), 6.2 (b,c), 6.5 (b), 7.2 (b)

Suggested Grade Levels: 7-12

Suggested Time: Varies depending on activity; each activity takes 1-2 days (including homework).

Suggested Course Content: Social studies (U.S. history, world history, global studies, current issues)

Objectives:
A. To complete a timeline given a time span and key events.
B. To identify fallacies in interpreting statistics.
C. To create bar or pie graphs to show information.
D. To make a map showing information related to alliance systems and the spread of nuclear weapons.

Procedure: Have students complete one or more of the following activities, correlated to Objectives A-D:

Objective A: Have students make a timeline of significant events of the atomic age that changed the course of world history between 1910 and the present. Distribute the handout of "Significant Events in the Atomic Age" to each student. Provide students with other guidelines as deemed necessary for making the timeline.

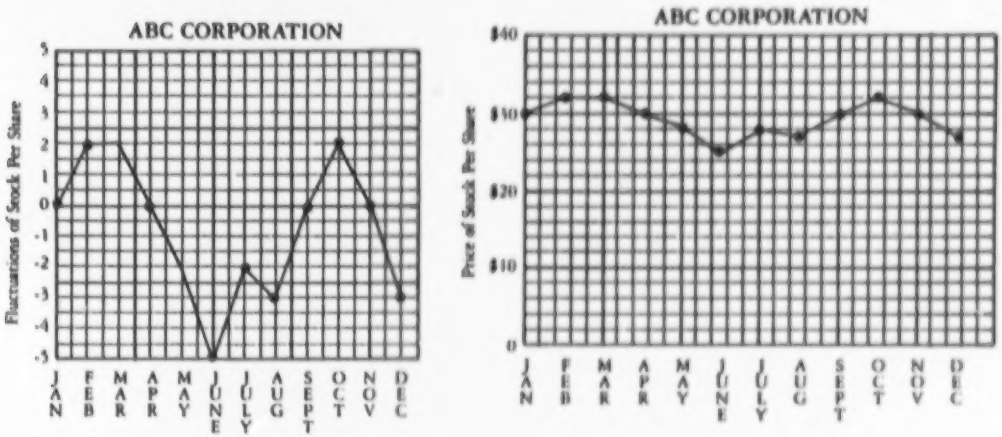
Objective B: Have students identify fallacies in interpreting statistics.

a. **Make certain an appropriate measure of average is used.** There are three possibilities: The mode (most common score), the median (the middle score), and the mean (the average score, sum of scores divided by number of scores). A teacher reports these scores 61, 62, 63, 66, 66, 67, 68, 69, 71 and 98. How many below-average students does the teacher have? Answer: 3 if the mode (66 is used, 5 if the median (66.5) is used, and 8 if the mean (69) is used.

b. **Consider whether given statistics have the same meaning over time.** Does the fact that a much larger proportion of families today have an income over $10,000 mean families today are much richer than families in the past? (That would depend upon how much those dollars are worth--what they will buy.)

c. **Consider whether the shape of a statistical figure is misleading.** The price of a given stock started at $30 and fluctuated by $7 during a year. Consider how different these fluctuations appear in each of the following graphs.

Which graph makes the price of the stock look most stable?



Objective C: Have students use almanacs to locate statistics related to (a) comparative numbers of nuclear weapons (b) percentages of GNP spent on the military (c) percentages of the U.S. and U.S.S.R. GNP spent over time on weapons, etc. Have them create bar or pie graphs to display the information collected.

Objective D: Students should be given the following information and asked to color a world map and make an appropriate key that shows: (a) countries that have nuclear weapons--United States, Great Britain, People's Republic of China, Soviet Union, France, India; (b) countries that are believed now capable of building nuclear weapons--Canada, West Germany, Pakistan, Switzerland, Sweden, Israel, South Africa, Japan; (c) countries that could have nuclear weapons within the next five years: Brazil, Spain, Netherlands, Finland, Austria, Republic of China (Taiwan), Australia, Argentina, Belgium, Denmark, Italy, Iraq, South Korea; (d) countries that could have nuclear weapons in six to nine years: Libya, Norway, Egypt, Yugoslavia. Students can then use a piece of tracing paper to make an overlay to show the NATO countries and the Soviet bloc. (Note: Direct students to use light colors on their original maps so patterns used on the overlay will be visible).

Evaluation: Evaluate student products correlated to objectives.

[1]World Military and Social Expenditures (updated annually); Soviet Military Power, U.S. Department of Defense (updated annually; center for Defense Information, 1500 Massachusetts Avenue NW, Washington, DC 20005. Discuss with students the reliability of sources used.

SIGNIFICANT EVENTS IN THE ATOMIC AGE

1910-1934: Scientists in Europe and the United States study the nature of the atom.

1934: Physicist Enrico Fermi demonstrates artificial radioactivity by irradiating atoms with neutrons.

1938: European scientists emigrate to the United States in response to the rise of Fascism.

1939: Niels Bohr of Denmark reports that the two halves of an atom weigh less than the original mass. The scientific conclusion: the missing mass was transformed into energy.

Leo Sziland and Albert Einstein warn President Roosevelt that German scientists are working on an atomic weapon. F.D.R. forms an Advisory Committee on Uranium.

1941: The "Manhattan Project" is set up to build an atomic bomb as quickly as possible.

1942: Fermi demonstrates the first nuclear chain reaction.

1945: An atomic device is exploded in a steel tower in New Mexico, the dawn of the age of nuclear weapons.

Henry Stinson, United States Secretary of War, estimates that over one million United States servicemen will be killed in the war against Japan if the "island hopping" nature of the Pacific War continues. Some scientists recommend that the bomb not be used. After weighing pros and cons, President Truman orders that the bomb be used. On August 6 at 8:15 AM, an American B-29 bomber, the "Enola Gay," drops the first atom bomb on Hiroshima, Japan. Over 100,000 people die immediately. On August 9, the United States drops a second bomb on Nagasaki, Japan. Japan surrenders on August 14.

1948: The United States proposes the Baruch Plan (calls for the international control of nuclear weapons); the U.S.S.R. rejects it. the United States begins nuclear weapons testing in the Pacific. The Soviet Union attempts to match the United States' military might by mobilizing vast armies. The cold war begins.

1949: The Soviet Union explodes its first nuclear bomb. The United states and most western European countries join together to form NATO, the North Atlantic Treaty Organization in response to continued Soviet military occupation of Eastern Europe.

1951-1955: The United States develops the hydrogen bomb and tests it in the Pacific (1952). The first Soviet H-bomb is tested (1953). The U.S.S.R. and most eastern European countries join together to form the Warsaw Pact (1955).

1956-1960: The U.S.S.R. launches Sputnik, the first artificial earth satellite, beginning the space race (1957). The United States spurs civil defense programs, launches its first satellite, Explorer I, and the "missile gap" becomes a presidential election issue. The United States increases its ICBM development program and designates large funding for engineering, mathematics and science.

1961-1965: The Soviets deploy the first ICBM and explode a 50 megaton hydrogen bomb (3000 times more powerful than the bomb used on Hiroshima). In the United States President Kennedy pushes for more funding for missiles and launches the first ballistic missile submarine. The first ICBMs capable of reaching the Soviet Union are developed. The Cuban missile crisis occurs and the 1963 Limited Test Ban Treaty prohibits all weapons testing in the atmosphere, under water, and in space. This is the first treaty of its type between the United States and the U.S.S.R.

1966-1970: The United States develops MIRVs, and the U.S.S.R. engages in a massive build up of ICBMs and deploys its first SLBM. The 1968 Nuclear Non-Proliferation Treaty represents the first attempt to control the spread of nuclear weapons beyond the five countries which already have them: the United States, the Soviet Union, France, Britain, and the People's Republic of China.

1969: The first Strategic Arms Limitation Talks (SALT I) begin.

1971-1975: The SALT I Treaty is signed and ratified by the United States and the Soviet Union. The Soviet Union continues modernizing and expanding its missiles and warheads.

1976-1980: In response to the Soviet buildup, the United States looks for ways to protect its missiles from possible Soviet attack. The MX missile is developed. The Soviet Union continues to modernize its nuclear forces, and its submarines are equipped with MIRVs. Arms control efforts between the superpowers result in the SALT II treaty, but the treaty is not ratified in the U.S. Senate.

1981-present: Strategic Arms Reduction Talks (START) are proposed by President Reagan, with a focus on the long-range or strategic weapons of the two countries. Reagan's Strategic Defense Initiative (SDI) becomes an issue of debate in the United States. The United States and the Soviet Union agree to dismantle their medium range missile systems.

Topic: The History of the Nuclear Arms Race

Title: "Deciding to Use the Atomic Bomb, 1945"

Source: Reprinted with minor changes from American History and National Security: Supplementary Lessons for High School Courses, The Mershon Center, The Ohio State University, Columbus, OH, ©1987), pp. 157-165. Reprinted with permission.

Essential Learning Skills: 2.1 (a), 3.1 (a,d,e), 4.2 (a), 6.4 (c), 6.5 (b), 6.6 (c)

Suggested Grade Levels: 9-12

Suggested Time: 2-3 days

Suggested Course Content: Social studies (U.S. history)

Objectives:

A. To know when and where the United States used an atomic bomb in World War II.
B. To discuss major factors that influenced President Truman's decision to use the atomic bomb to end World War II.
C. To explain why President Truman decided to use the atomic bomb in preference to other options.
D. To make defensible judgments about President Truman's decision to use the atomic bomb against Japan.

Procedure:

1. Have students read the case study in the handout on Truman's decision to drop the atomic bomb and answer the questions at the end of the handout in preparation for classroom discussion.

2. Conduct a classroom discussion on the questions at the end of the lesson. Students should be required to ground their answers to Question 5 on information in this lesson and to provide sound reasons for their judgments.

Notes to the Teacher:

- It is useful to keep two issues in perspective regarding the use of the atomic bomb against Japan . These issues are: (1) the question of whether the Japanese were attempting to surrender before the bombs were used, and (2) the question of whether Truman's prime motivation in using the bombs was to scare the Soviets and inhibit Soviet adventurism in Europe and Asia.

- As to the first issue, authors now commonly say that the Japanese government was trying to surrender during the spring and summer of 1945. In fact, this is not correct. Some members of the Japanese government, particularly within the diplomatic corps, were very eager to find out whether surrender was possible. They did not approach the United States directly, instead going to governments, most notably the Soviets with whom they were not at war. We knew of these efforts, though, because we were reading the Japanese

codes. But knowing was not the issue. The issue was that the Japanese never signaled a willingness to surrender unconditionally which was a vital precondition for the Americans. It is ironic, and sad, that eventually the Japanese were allowed to retain the Emperor as a figurehead acting under the supervision of the American commander. This was important to the Japanese. Had we been willing to accept that condition in the spring of 1945, who knows what might have happened? But the point is that no one, on either side, thought of the solution until after the bombs were dropped. Furthermore, it is important to recognize that there were powerful people inside the Japanese government who did not want to surrender before--or after--the bombs were dropped. There was an attempted military takeover of the government when it was learned in Tokyo that surrender was being considered. Thus, it is incorrect to say that the Japanese government was trying to surrender but that the U.S. ignored these efforts.

- As to the second issue, the point has often been made that the U.S. dropped the bombs not to end the war, but instead because of our relationship with the Soviets. This is a complicated issue. First, decisions are seldom made for a single reason, there are usually several reasons and sometimes it is even difficult to tell which is the most important out of the agreed upon list of why's. In this case it does not seem that difficult. Far and away the most logical, most often stated reason was to end the war quickly and spare American lives. This would also preclude the Soviets, who were beginning to be troublesome in Europe, from getting deeply involved in Asia and gaining opportunities to be troublesome there.

  Historians also argue about who is responsible for starting the Cold War. The first to suggest that the U.S. dropped the bomb to warn or impress the Soviets were those historians who were trying to prove that the U.S. had started or significantly accelerated the Cold War. Because the issue of U.S.-Soviet relations came to dominate the world after the war, there is a natural tendency to look at things in the U.S.-Soviet context even in 1945. Actually, in 1945, rightly or wrongly, the U.S. was more concerned with U.S.-Japanese relations than with U.S.-Soviet relations.

Evaluation: Answers to questions on the handout and classroom discussion.

Handout: Deciding to Use the Atomic Bomb, 1945

In the summer of 1945, President Harry Truman faced a difficult decision: whether or not to drop an atomic bomb on a target in Japan. What was the occasion for decision? How was the decision made? What factors influenced the President's choice? To what extent and how was the President limited in his alternatives in making this critical decision?

Background to a Difficult Decision

The war in Europe was moving toward its close and ended on May 9, 1945. By allied agreement, the war in Europe had been the primary activity--Germany first, Japan second. This list reflected the fact that for the United States Europe was more important than Asia. Now, with the war over in Europe, there was a tremendous problem of rebuilding a war-torn continent. This was not a simple problem. There were many issues to be decided, and the consequences of failure to act quickly and effectively were very serious. Not only would millions of people suffer terribly from hunger and lack of housing, but also out of war might grow revolution and even new war. There was reasonable concern that communists might seize power in France, Italy and Greece, and it seemed possible that the Soviets might help them. Policy-makers believed the best way to deal with these problems would be to bring the war in the Pacific to a close as quickly as possible so that attention could be turned to rebuilding Europe.

At the same time there was growing awareness that the wartime cooperation with the Soviets would not last long after the end of actual hostilities. There were already disturbing indications that the Soviets would be difficult to deal with in Eastern Europe and that they interpreted some agreements entered into with the allies differently than the allies interpreted them. The Cold War had not really begun, but a chill was already in the air.

One agreement the Americans believed the Soviets would honor was the agreement entered into at Teheran and confirmed in writing in Yalta. This "Yalta Agreement" stated that the Soviets would enter the war against Japan within 90 days after the war ended in Europe. At the time this agreement was made, U.S. military authorities had wanted all the help they could get in defeating the Japanese. The problem was the larger role the Soviets played in defeating Japan, the larger the role they would claim in settling the future of Asia. Since they were proving difficult to deal with in Europe, would it not be wise to limit their role in Asia? In the summer of 1945 the invitation to enter the war in the Pacific could not be withdrawn since that would stir Soviet suspicions and make them even more difficult to deal with. The best solution was to end the war against Japan as quickly as possible.

Basic to dealing with all of these issues was the military course of the war. By the summer of 1945, the U.S. had been fighting for three and one-half years. There had already been more than one million casualties and significant losses of material. During recent fighting in the Pacific there had been some disturbing developments. When the Marines had assaulted Iwo Jima in February of 1945, only 212 Japanese soldiers chose surrender over death. In April, the Japanese had begun their suicidal Kamikaze attacks on American naval ships. At Okinawa they had again put up fanatic resistance, fighting virtually to the last man before finally being overrun. What this meant to many American planners was that the planned assault on the Japanese home islands would be an extremely bloody affair. There were hundreds of thousands of Japanese soldiers on the main islands, and if they fought as the soldiers had fought on Iwo Jima and Okinawa, an invasion of those islands would probably result in a million U.S. casualties as well as untold military and civilian casualties on the Japanese side.

Source: American History and National Security: Supplementary Lessons for High School Courses, The Mershon Center, Columbus, OH, 1987.

As always, there were personality and experience factors at play as well. Harry Truman had become President in April 1945 when Franklin Roosevelt had died. Roosevelt, the only President in U.S. history to be elected to the highest office four times, had left very big shoes to fill. FDR had been a hero to many for seeming to cope successfully with the Depression; then he had taken on the war against the Axis Powers and by spring 1945 seemed to be winning that as well. Truman, on the other hand, was a virtual unknown. Roosevelt had surprised most of the party regulars when he had picked the obscure Senator from Missouri to be his Vice-Presidential running mate in 1944. Although Truman had served in World War I and later became a judge, what many people remembered about him was that he had gone bankrupt as the owner of a hat store. Whereas Roosevelt had looked presidential, Truman with his bow ties and glasses looked like a schoolmaster; while Roosevelt had socialized with kings and queens, generals and princes, Truman seemed most comfortable in the presence of his World War I buddies and the plain folks of Independence, Missouri. In the spring of 1945, as Truman was getting used to the complexities of leading the nation and its allies toward the conclusion of the greatest war in history, the American public was getting used to a new kind of leader. In this situation, the wisest thing for Truman to do if he intended to lead successfully was to deviate as little as possible from the course set by FDR.

Roosevelt had left Truman with at least two important legacies. First was an atomic bomb program that by 1945 had spent the almost unheard of sum of one billion dollars. As Vice President, Truman had not even known of this program, and it was not until weeks after he became President that his Secretary of War filled him in on the details. Building the weapon had been a great scientific challenge with the U.S. racing to beat German scientists to be the first to have the weapon. During the development stages the clear intent had been to use the bomb either against Germany of Japan once it was developed. With Germany out of the war, Japan remained the sole target. No one knew precisely when the bomb would be ready, but Roosevelt had apparently left Truman with a weapon that might end the war -- if it were used properly.

The other thing FDR had left his successor was a policy regarding how countries could surrender. At the Casablanca Conference in 1943, Roosevelt had announced that the only kind of acceptable surrender was "unconditional surrender." In other words, a surrender in which the enemy could set no terms: they simply laid down their arms. Germany had surrendered under those terms, so there was already evidence that even fanatical enemies could be forced to accept these very harsh terms.

The problem was that by summer 1945 the U.S. knew some powerful elements within the Japanese government were considering surrender, but they had terms that they insisted upon. By means of reading secret Japanese codes, the U.S. knew that some Japanese wanted to surrender but only if they could retain the Emperor. To some Americans, the Emperor was seen as the cause of the war and hence that term was particularly unacceptable; to others, probably most, any terms were unacceptable. In this case, had Truman accepted any terms he would have been going directly against the policy set by FDR, and seeming to ignore the success gained against Germany.

Disagreement Among the President's Advisors

The foregoing were all major factors in the developing situation, but there are still other influences to be considered. Governments are made up of many individuals with many points of view. This multitude of opinions was certainly true in this case. The senior Japanese expert in the Department of State was former Ambassador to Japan Joseph Grew; during part of the spring he was Acting Secretary of State. Grew believed that it would be wise to allow the Japanese to

he was Acting Secretary of State. Grew believed that it would be wise to allow the Japanese to retain the Emperor because he would bring much needed stability to a defeated Japan. Differing with Grew was Truman's personal advisor who would become Secretary of State in July, James Byrnes. Byrnes believed that the Emperor represented much that was wrong with the Japanese government and definitely should go.

If the Japanese were going to surrender unconditionally, the next question was how to end the war. An obvious option was to drop the bomb, but even among the scientists who had worked on the weapon there were differences of opinion. One group, the so-called Chicago scientists, urged that the bomb not be used or that at a minimum, it only be used against a military target after a demonstration. Another group, the so-called Los Alamos scientists, believed that the bomb should be used first against a military target.[1] The issues of a demonstration also caused heated debates. Some feared that if we announced where we were going to demonstrate the bomb, the Japanese would move U.S. POW's there, thus making it impossible to drop the bomb. Others argued that we did not have enough bombs to waste them in demonstrations. Since it was estimated that by August we would have only two bombs, that was a pretty good argument.

The deciding argument against a demonstration, and one that has a bearing on other parts of the story, seems to have been that no one really knew if a bomb could actually be dropped successfully on a target. Furthermore, there was uncertainty about how much damage the bomb would do. If we held a highly publicized demonstration and the bomb either did not go off or did comparatively little damage, the U.S. would end up looking ridiculous and it might even increase Japanese will to resist. Since the primary objective in using the bomb was to bring the war to a speedy conclusion, doing anything that might undermine that purpose was a fundamental question under consideration.

Finally, there were differences of opinion among the President's senior military advisors. Admiral William Leahy, who had been FDR's and was now Truman's personal military advisor and chairman of the U.S. Joint Chiefs of Staff, was opposed to using the bomb on moral grounds. General George C. Marshall, the Army Chief of Staff and in some ways the most influential military voice in Washington, was in favor of using the bomb because he believed that in the long run it would save lives. Some naval officers, knowing that the U.S. was now sinking Japanese shipping virtually at will, believed the bomb was unnecessary because soon Japan would be starved into submission. Some air corps officers like Curtis LeMay believed that conventional fire bombing raids such as the one in March against Tokyo which burned out fifteen square miles and killed 83,000 people, would be sufficient to bring Japan to its knees.

Deciding to Use the Atomic Bomb

What should a President do when experts disagree? Truman did what many decision makers do in such a situation: he appointed a committee. The Interim Committee, as it was called, was made up of some of the wisest and most experienced men in American government. Chairing it was Secretary of War Henry Stimson who had first come into prominence in 1911 as Secretary of War under William Howard Taft. Since that time he had served various Republican and Democratic Presidents, most notably as Secretary of State from 1919-1933. Included as advisors to the committee were some of America's most brilliant scientists. This was a group of very important men.

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[1] J. Robert Oppenheimer made this decision.

On June 1, 1945, the Interim Committee made its recommendation to President Truman. They recommended that the bomb be used against the Japanese as soon as possible. Furthermore, they noted that "we can propose no technical demonstration likely to bring an end to the war; we see no acceptable alternative to direct military use."

There was yet a final decision for Truman to make: when and where to drop the bomb. But as for actually using it, Truman said: "[I] never had any doubt that it should be used." Recent evidence suggests that there was more soul searching than this comment would imply; however, by early summer the basic decision had been made. Soon thereafter Truman decided where it should be used: against "a war production center of prime military importance."

Two additional factors influenced Truman's decision-making. After June I, 1945, the only way to keep the bombs from dropping would have been by Truman deciding **not to act on a decision that had already been made.** In other words, he would have had to stop a process in motion. That is quite a different thing than deciding to put a process in motion. One could agree that from the very day the process of building the bomb was started, the decision had been made, and from that point forward things happened more or less automatically. It would have taken an act of tremendous political courage for the new President to have overruled his advisory committee, even if he had disagreed with them, and to run the risk of more American deaths. Can you see the headline: "President Spares Japanese: A Million G.I.'s Die"? The alternative became very clear to him on June I8 when the Joint Chiefs of Staff forwarded him the plan for the invasion of Japan. He approved it. Invasion would occur unless the war could be ended quickly.

Decisions are like stones rolling downhill. The further they roll, the more difficult they are to stop. They pick up speed or, in this case, involve more and more people. At some point they become almost impossible to stop. Only in movies or novels does a character step in at the last moment and stop the landslide. In real life, the fact that money has been spent becomes an argument for spending more money, that one group has decided something becomes an argument for others to go along, that one plan has been made leads to the next plan being made. That is how it was in the summer of 1945.

Another factor was chronology or the quick pace of events in 1945. Things happened fast in the summer of 1945. Truman had become President on April 12; less than a month later, May 9, Germany surrendered. Three weeks later, June 1, the Interim Committee made its recommendation; Truman had been President less than nine weeks. On July 6 Truman left Washington for the first meeting he would have with our wartime allies, Churchill and Stalin. The meetiong was at Potsdam outside Berlin. Truman would cross the Atlantic by ship. The conference began July 16. The same day Truman received a message that the test explosion at Alamogordo had been a success. Truman and Chruchill immediately set to work on a document that came to be known as the Potsdam Proclamation, which called on the Japanese to surrender--unconditionally--or face complete destruction. The possession of a new weapon was hinted at but not spelled out. On July 24, orders were sent to the Air Corps Commander in the Pacific to drop the bomb on one of four Japanese cities as soon after August 3 as weather would permit. *When* had now been decided. On July 28, the Japanese broadcast what was interpreted to be a rejection of the Potsdam Proclamation. On August 1, the Potsdam Conference ended and Truman began the trip home. He was on the cruiser Augusta when, on August 6, the first bomb was droppped on Hiroshima. Truman had been President for four months.

Several other chronological points: the President had been out of the country and consequently somewhat out of touch for the month preceding the dropping of the bomb; only three weeks separated the first test explosion and the actual dropping of the bomb from a plane. (There was absolutely no assurance that an air drop would work; the test had been a bomb fixed to the top of

a tower, set off by remote control.) Estimates were that if it did work there would be far fewer casualties than there were. Finally, during the actual drop (August 6), Truman's mind was fully occupied preparing for and participating in a conference that would decide the fate of post-war Europe--an issue that probably seemed more important than the issue of whether you killed Japanese by dropping firebombs or by dropping this new atomic bomb.

Who Was Responsible?

In conclusion, let us turn to the matter of who, in the final analysis, was responsible for the dropping of the bomb. Obviously, Truman was in part responsible, because as the famous sign on his desk said, "The Buck Stops Here." But Truman was in many ways a prisoner of events and time. He was influenced by advisors and by decisions made by others. Although easy for us to forget, the ghost of Franklin Roosevelt must have haunted Truman. Roosevelt had made many of the decisions that propelled Truman down the road he followed. Very significantly, FDR had made the decision not to inform his Vice-President about the work on the bomb, thus insuring that Truman's decision-making would take place without preparation in the first hectic weeks of his presidency. Finally, Truman's decision to drop the bomb was a decision to try not to do something else, in this case invade the Japanese home islands. This points up the important fact that decisons are often choices between unpleasant alternatives.

But there was another group who might be charged with at least some responsibility for dropping the bomb. The Japanese governmental leaders also made decisions that bore on this event. In the first place, the Japanese made a positive decision in the winter of 1941. They **chose** to attack the United States. Had there been no Pearl Harbor, there would have been no Hiroshima. The Japanese also made a negative decision in the summer of 1945. They chose **not** to surrender unconditionally. Leaving aside the good reasons for why they did not want to do this, and there were some, the fact remains that they had the opportunity to surrender and they chose not to. By the summer of 1945, the Japanese were, in the words of an American general, being "bombed back into the stone age." Their ships could not defend their harbors or bring in the raw materials necessary for survival. The war was lost, but the leadership would not give up. They made a decision not to do something, and that brought about Truman's decision to do something.

Reviewing and Interpreting Main Ideas

1. When did President Truman decide to use the atomic bomb as a weapon in war?

2. Where was the first atomic bomb dropped?

3. How did each of the following factors affect President Truman's decision to use the atomic bomb against Japan?

    a. actions of Truman's predecessor, President Roosevelt

    b. the end of the war against Germany

    c. the Soviet Union's agreement with the U.S. to declare war on Japan

d. the response of the Japanese government to the U.S. demand for unconditional surrender

e. the fighting abilities and resources of the Japanese army

f. the number of atomic bombs available to the U.S.

g. the fact that the atomic bomb had neither been used in warfare nor dropped from an aircraft

h. advice from top-level advisors

4. Why did Truman decide against the following alternatives?

a. demonstrating the power of the atomic bomb, and thereby influencing the Japanese to surrender, by dropping it on an uninhabited island

b. using conventional weapons in an invasion of Japan

c. dropping the demand for unconditional surrender and negotiating a peace settlement with the Japanese

5. What is your judgment of Truman's decision to drop an atomic bomb against Japan? Was it a good decision? Why?

Topic: The Effect of the Arms Race on Local, National and International Economics

Title "Military Spending by Other Countries"

Source: Reprinted with minor changes from Economics and National Security: Supplementary Lessons for High School Courses, The Mershon Center, The Ohio State University, Columbus, OH, ©1987, pp. 158-165. Reprinted with permission.

Essential Learning Skills: 1.4 (b), 1.6 (b.f), 3.1 (b) 6.1 (a), 6.2 (b,c) 6.3 (h) 6.5 (b)

Suggested Grade Levels: 9-12

Suggested Time: 1-2 days

Suggested Course Content: Global studies, economics

Objectives:

A. To read tables containing data about worldwide military expenditures.
B. To interpret the tables and create new tables using data presented.
C. To use data from the tables to hypothesize about connections between armaments sales and purchases and threats to world peace.

Procedure:

Preparation: Students will need a world map for this lesson. Before beginning the lesson examine the Handout and note the countries the students must locate. Be prepared to correctly locate these in case students have difficulty doing so.

1. Distribute the handout and review its contents. Have the students read the handout.

2. Explain to students that they are to answer the questions in the handout by using the data in Tables 1-4. Have students work alone or in small groups.

Notes to the Teacher:

- Anticipate questions regarding "industrialized" nations. In general this term is used to refer to North America, Europe, Turkey, Australia, New Zealand, Japan and the Soviet Union. Data on the Third World does include Taiwan (Republic of China) despite that country's industrialization. The term Third World is loosely used to include Central and South America (Mexico and the Caribbean area included), North Africa, Sub-Sahara Africa, the Middle East, East Asia (Mongolia, China), North and South Korea, and South Asia (other countries of Far East excluding Japan).

3. Reinforce the following points with the students:
   a. From the data in Table 1 students should realize that the U.S. and West European countries make up a greater share of total arms exports than does the Soviet Union alone.

b. In Table 2 students should recognize that almost two-thirds of arms importers are non-industrial nations.

c. As the students work with Table 4, point out that the percentage of GNP spent on defense does not reveal the amount spent. You might use the following illustration. If Guyana and Malaya both spent 7 percent of GNP on defense, the amounts spent would be very different--$36 million for Guyana (7 percent of $507 million) and $2 billion for Malaya (7 percent of $29 billion).

4. Discuss the questions under "Applying What You Have Learned." These are open-ended questions. But students should refer to data in the lesson to explain their responses.

5. It probably will be clear that the Middle East and North Africa are the world regions importing a large number of weapons and devoting large parts of national GNP to military spending. Ask the students if it follows that this part of the world is a "powder keg" or threat to peace? What current events can the students apply to support their arguments for or against this hypothesis?

6. Have the students note that the major exporters of arms are not located in the world area that is the major importer of arms. Discuss the following: If war erupts in a non-industrial region, the exporters will not be directly involved, but can they remain uninvolved? You might also discuss what could be done to control or reduce the sale of arms by the major exporters.

Answers to the Handout

- (1) the U.S.S.R; (2) 44.5 percent; (3) non-industrialized nations: 62.2 percent; (4) Middle East: 27.3 percent; (5) 36.5 percent; (6) 13.2 percent; (7) 7.7 percent; (8) 4.8 percent; (9) 10 of the 17 nations listed (Libya, Saudi Arabia, Iraq, Syria, Israel, South Yemen, Egypt, Morocco, Algeria, Kuwait); (10) Middle East and North Africa combined: 54.5 percent; (11) In Table A (Middle East and North Africa) students should list Kuwait, Saudi Arabia, Jordan, Libya, Israel, Oman, Syria, Iraq, Morocco, North Yemen, Egypt, Tunisia and Algeria, a total of 14 nations; (12) In Table B (South and Central America) students should list Cuba, Haiti, Chile, Guyana, Argentina, Guatemala, Venezuela, Bolivia, El Salvador, Uruguay, Peru, Nicaragua, Paraguay, Ecuador, Honduras, Mexico, Panama, Colombia, Jamaica, Brazil and Costa Rica, a total of 21 nations; (13) In Table C (East and South Asia) students should list North Korea, Republic of China (Taiwan), Malaya, Burma, Pakistan, Bangladesh, Philippines, Nepal, Japan, Thailand, South Korea, India and Indonesia, a total of 13 nations; (14) In

Table D (Sub-Sahara Africa) students should list Mauritania, Zimbabwe, Ethiopia, Zambia, Chad, Kenya, Sierre Leone, Uganda, Zaire, Tanzania, South Africa, Congo, Nigeria, Sudan, Liberia, Senegal, Ivory Coast, Ghana, Togo, Cameroon, Benin, Malawi and Gabon, a total of 23 nations; (15) Middle East and North Africa, 9 of 14 nations = 64.3 percent; (16) Middle East and North Africa, 9 of 14 nations = 64.3 percent; (17) South and Central Americas, 17 of 21 nations = 80.9 percent.

Extending the Lesson:

1. Have students gather information to show how military expenditures and sales affect the balance of payments, the availability of hard currency, and the trade deficit.

2. Have students research and compare expenditures on social programs (quality of life indicators) vs. military expenditures.

   Resources used might include: World Military and Social Expenditures (updated annually); Soviet Military Power, U.S. Department of Defense (updated annually); Center for Defense Information, 1500 Massachusetts Avenue NW, Washington, DC 20005. Discuss with students the reliability of sources used.

Evaluation: Answers to questions on the handout and classroom discussion.

Defense Spending by Other Countries

Since World War II the U.S.S.R. and the United States have accounted for more than half the world's expenditures for armaments. But in recent years the Soviet and American share of spending has declined. In 1970 these two super powers accounted for approximately 56% of worldwide military expenditures. By the 1980's, however, their share had dropped to 48%.

Like the Soviet Union and the U.S., all countries must make difficult decisions about the allocation of scarce economic resources. Other countries decide how much to spend on defense based on several things inciuding military strategy, commitment to international alliances, domestic needs, and their security position.

In the early 1980's the defense spending by America's allies including West Germany and Britain did not significantly increase. During the period from the 1970's into the 1980's defense spending by Saudi Arabia, Israel, the Persian Gulf states, and other countries in the Middle East and North Africa increased dramatically. These sharp increases in a relatively brief period of time reflected a growing perception of the threat of war in this region.

In this lesson you will examine data about defense spending in other countries. Study Tables 1-4 and then use information in the Tables to answer questions that follow. You will use this data to form some opinions about the relationship of trade and spending on arms to possible threats to peace.

Data on Defense Spending

Table 1

Major Exporters of Weapons

Country	Percentage share of world exports of weapons
U.S.S.R.	36.5%
United States	33.6
France	9.7
Italy	4.3
Britain	3.6
West Germany	3.0
Third World nations	3.0
Other nations	6.9

Source: Ben Crow, Alan Thomas, et al, Third World Atlas, Open University Press, Milton Keynes, U.K., and Philadelphia, 1984, pages 64-65.

From *Economics and National Security*. Mershon Center, The Ohio State University.

Table 2

World Imports of Weapons by Regions

Region	Percentage of share of world imports of weapons
Industrialized countries	37.8%
Middle East (West Asia)	27.3
North Africa	9.2
East Asia	8.3
South America	6.2
South Asia	4.9
Sub-Sahara Africa	4.8
Central America	1.5

Source: Ben Crow, Alan Thomas, et al, Third World Atlas, Open University Press, Milton Keynes, U.K. and Philadelphia, 1984, pages 64-65.

Table 3

Major Third World Importers of Weapons

Country	Percentage shares of third world imports of weapons
1. Libya	9.0%
2. Saudi Arabia	8.9
3. Iraq	7.7
4. Syria	7.3
5. Israel	6.8
6. India	5.1
7. South Yemen	3.9
8. Egypt	3.9
9. Vietnam	3.7
10. Morocco	2.8
11. Peru	2.7
12. Algeria	2.6
13. South Korea	2.5
14. Argentina	2.2
15. Indonesia	2.0
16. Cuba	1.7
17. Thailand	1.6
18. Chile	1.6
19. Kuwait	1.6
20. Republic of China (Taiwan)	1.5
21. Other Countries	20.9

Source: Ben Crow, Alan Thomas, et al, Third World Atlas, Open University Press, Milton Keynes, U.K. and Philadelphia, 1984, pages 64-65.

Table 4
Percent of GNP Devoted to Military Expenditures

Some countries with less than 1% of GNP spent for military expenditures

Mexico	Brazil	Colombia	Japan
Panama	Costa Rica	Jamaica	

From 1% to 4%

Argentina	Nepal	Peru	Paraguay
Bangladesh	Bolivia	Zaire	India
Tunisia	Sierre Leone	South Africa	Ecuador
Guatamala	El Salvador	Nicaragua	Honduras
Philippines	Thailand	South Korea	Indonesia
Venezuela	Uruguay	Algeria	Sudan
Kenya	Uganda	Nigeria	Liberia
Senegal	Ivory Coast	Ghana	Cameroon
Gabon	Malawi	Togo	Benin

From 4% to 7%

Malaya	Burma	Pakistan	North Yemen
Morocco	Chad	Congo	Egypt
Chile	Tanzania	Guyana	

From 7% to 10%

Cuba	Haiti	Ethiopia	Zambia
Republic of China (Taiwan)			

From 10% to 20%

Mauritania	Libya	Zimbabwe	Iran
Saudi Arabia	Israel	North Korea	Iraq
Jordan	Oman	Syria	Kuwait

Source: Ben Crow, Alan Thomas, et al, Third World Atlas, Open University Press, Milton Keynes, U.K. and Philadelphia, 1984, pages 64-65.

Questions About Table 1

1. What country is the leading exporter of weapons?

2. Italy, Britain and West Germany are active partners with the United States in a military alliance known as NATO. What share of the world's total weapons exports do these four countries account for?

Questions About Table 2

3. Which is larger: the share of total weapons imported by industrial or non-industrial nations?

4. Outside the industrialized world, which world region is the largest importer of weapons?

5. What share of total imports do the Middle Eastern and North African nations combined account for?

6. What share do East Asia and South Asia combined account for?

7. What share do South America and Central America combined account for?

8. What share do nations south of the Sahara Desert account for?

Questions About Table 3

9. How many of the leading Third World importers of weapons are located in the Middle East or North Africa?

10. What share of total Third World imports do major importers in the Middle East and North Africa account for?

Questions About Table 4

11. Make a table of your own. Label it Table A. In it list the countries from Table 4 located in the Middle East and North Africa. Arrange these countries by percentage of GNP spent on weapons.

12. Make another table. Label it Table B. Include in it the countries of East and South Asia. Arrange these countries by percentage of GNP spent on weapons.

13. Make a Table C to include the countries of South and Central America. Arrange these countries by percentage of GNP spent on weapons.

14. Make a Table D to include the countries of Sub-Sahara Africa. Arrange these countries by percentage of GNP spent on weapons.

15. Examine the tables you have created. In which of the four world areas do the largest percentage of nations spend 10% or more of their GNP on weapons?

16. In which of the four world areas do the largest percentage of nations spend 7% or more of their GNP on weapons?

17. In which of the four world areas do the largest percentage of nations spend 4% or less of their GNP on weapons?

Applying What You Have Learned

18. Based on what you have learned in this lesson, what part of the world do you think is most likely to be a threat to peace? Explain the reasons for your opinion.

19. In your opinion, what does the purchase of arms have to do with the likelihood of war or peace?

20. In your opinion, are those areas of the world where the trade in arms is relatively small more likely to enjoy peace than other areas? Explain.

Topic: **The Debate: Potential Effects and Dangers of the Use of Modern Weapons**

Title: **"Civil Defense Debate"**

Source: Developed at the Oregon Department of Education. Information on the debate process adapted from material presented in J. Regis O'Connor, Speech: Exploring Communication, Prentice Hall, 1988.

Essential Learning Skills: 1.3 (b-c), 2.1 (a), 2.3 (d,g), 3.1 (a,b,c,d), 4.1 (a,b), 4.2 (e,f), 4.4 (d), 5.2 (b,e), 5.5 (a,b,c,d,e), 6.1 (a,b), 6.4 (c,d), 6.5 (a,b), 6.6 (b,c), 7.2 (a,b,c), 7.3 (d)

Suggested Grade Levels: This activity is appropriate for high school aged students. Younger students may engage in a modified debate or in a panel discussion presenting opposing sides.

Suggested Time: Varies according to students' familiarity with the debate process

Suggested Course Content: English Language arts (speech), social studies

Objectives:
A. To locate information relevant to a particular position.
B. To recognize the role of evidence in supporting an argument.
C. To present an argument in an organized, succinct manner.
D. To summarize opposing points of view on an issue.

Procedure: Organize a classroom debate on the issue of civil defense. a suggested proposition for the debate is:
Resolved, the United States should revitalize and expand its civil defense program in response to the nuclear threat.
The two sides in a formal debate are called the affirmative and the negative. One or two people may be assigned to argue each side.

Classroom Organization for a Debate:

Students should be assigned to groups with both affirmative and negative teams for several different propositions. Time for research in the Library must be allotted. Depending on the issues involved in the proposition and the level of sophistication desired in the debate, this may be from two or three days to several weeks. Some teachers encourage affirmative and negative teams to work together in gathering information and then to work separately in preparing their presentations.

Roles in a Debate:

The affirmative has two basic tasks: (1) attacking the status quo, or current situation and (2) arguing that a specific change should occur. The basic structure of an affirmative argument might be:

There is a serious problem caused by the present situation.

The affirmative offers an alternate plan of action that will solve the serious problems of the present situation and will be in and of itself beneficial.

Procedure (continued)

The affirmative has the burden of proof, because in debate the status quo is presumed the best way of continuing until the affirmative proves another plan better.

The basic task of the negative side is to disprove, or refute, the attacks on the status quo made by the affirmative. The negative side must prove the status quo is satisfactory or that the plan for change will not work.

The opposing sides take turns presenting their arguments. Because the affirmative is the one proposing a change from the present conditions, it always presents the first and last arguments.

Debate Format:

Standard Format	Speaking Time
First affirmative constructive speech	10 mins.
First negative constructive speech	10 mins.
Second affirmative constructive speech	10 mins.
Second negative constructive speech	10 mins.
First negative speaker's rebuttal	5 mins.
First affirmative speaker's rebuttal	5 mins.
Second negative speaker's rebuttal	5 mins.
Second affirmative speaker's rebuttal	5 mins.

(Additional information on organizing a formal debate may be obtained in most high school speech textbooks or from the speech teacher/ coach.)

*Several different formats may be used. Typically, affirmative and negative speakers alternate presentations.

Suggested classroom format for two person debate:

Affirmative speaker	5 mins.
Negative speaker	5 mins.
Affirmative rebuttal	3 mins.
Negative rebuttal	3 mins.

Suggested classroom format for Four person debate:

First affirmative speaker	4 mins.
First negative speaker	4 mins.
Second affirmative speaker	4 mins.
Second negative speaker	4 mins.
Affirmative rebuttal (either or both speakers)	2 mins.
Negative rebuttal (either or both speakers)	2 mins.

Evaluation: Class members may wish to vote on which side of the debate presented the most convincing argument.

To evaluate individual student performance, teachers may wish to use the following scale:

Language:

1. The language is inadequate for the task.
   - numerous grammatical errors
   - poor vocabulary
   - Many generalities--"stuff";
   - "things," "you know," etc.

2. The language is minimal for the task.
   - many grammatical errors
   - restricted vocabulary
   - some generalities

3. The language is adequate for the task.
   - few grammatical errors
   - adequate vocabulary
   - precise, persuasive terminology

4. The language is superior for the task
   - very few grammatical errors
   - vivid vocabulary
   - precise, persuasive terminology
   - use of metaphor, imagery, etc.

Delivery:

1. The delivery is inadequate for the task.
   - low volume, almost inaudible
   - rate of speaking is too fast or too slow
   - eye contact, posture, poise are poor

2. The delivery is minimal for the task
   - volume is too low or too loud
   - rate is too fast or too slow
   - eye contact, posture, poise are are inconsistent

3. The delivery is adequate for the task.
   - volume is audible
   - rate is appropriate
   - eye contact, posture, poise are inconsistent

4. The delivery is superior for the task.
   - volume and rate provide interest and emphasis
   - eye contact, posture, poise demonstrate enthusiasm and enhance presentation

Organization:

1. The organization is inadequate for the task.
   - message seems mixed up and at random
   - rebuttal fails to address issues raised by opposing side

2. The organization is minimal for the task.
   - message rambles and relationships among ideas are unclear
   - rebuttal may address some issues but is not clear and sequential

3. The organization is adequate for the task.
   - ideas are presented in sequence and relationships are clear
   - presentations have a clear opening and closing statement
   - rebuttal addresses issues in an orderly fashion

4. The organization is superior for the task.
   - sequence and relationships emphasize ideas
   - opening and closing statements are used to persuade
   - rebuttal is comprehensive and uses organizational strategies such as summarizing, enumerating, etc.

Content:

1. The content is <u>inadequate</u> for the

   - facts are in error or important information is missing
   - irrelevant information is introduced
   - speaker fails to cite sources for information

2. The content is <u>minimal</u> for the task.

   - there is not enough information to support the resolution
   - the speaker wanders off topic
   - facts and sources are not clear or represent only one point of view

3. The content is <u>adequate</u> for the task.

   - main ideas are supported by relevant detail
   - facts and sources represent authoritative information
   - where biased sources are used, speaker acknowledges bias but uses source effectively

4. The content is <u>superior</u> for the task.

   - a variety of evidence (facts, reasons, details, examples, etc.) is used
   - authoritative sources are used and cited
   - information is tightly woven to present only the most compelling details

Topic: **The Debate: Potential Effects and Dangers of the Use of Modern Weapons**

Title: **"Nuclear Winter: Myth or Reality?"**

*Sources: _____ "Commentary - Environmental Consequences of Nuclear War," Environment 28:2-5, October 1986

Sagan, Carl. "The Nuclear Winter," Carl Sagan, 1983. Available from Council for a Livable World Education Fund, 11 Beacon Street, Boston, MA 02108; (617) 542-2282.

Seitz, Russell. "In from the Cold: 'Nuclear Winter' Melts Down," The National Interest, No. 5: 3-17, Fall 1986. (Reprinted as Department of Defense Current News, No. 1564, April 1987.)

Weinberger, Caspar W. "The Potential Effects of Nuclear War on the Climate" (A Report to the United States Congress), March 1985.

Essential Learning Skills: 1.2 (a-c), 2.1 (a,b), 3.1 (c), 4.1 (a), 4.2 (a-e), 6.2 (a), 6.4 (c,d), 6.5 (b), 6.6 (b), 7.3 (c)

Suggested Grade Levels: 10-12

Suggested Time: 3-4 days (readings may be done as homework to save time)

Suggested Course Content: Social studies (global studies)

Objectives:
A. To comprehend the theory of nuclear winter.
B. To critically analyze and evaluate the theory of nuclear winter.

Procedure:
1. Have students read "The Nuclear Winter" by Carl Sagan. (This pamphlet of average readability presents a potentially frightening view of the aftermath of a nuclear war. Teachers should be sure to read the pamphlet prior to assigning it to their students.) Discuss with students: (a) What is the theory of nuclear winter? (b) According to Sagan, what will cause nuclear winter to occur? (c) How did Turco, et. al. arrive at the theory of nuclear winter? (d) What does Sagan offer as proof for the validity of this theory?

   (**Note:** The study upon which Sagan has based this article has come under heavy criticism by the scientific community. The article is presented here, however, because it marks the beginning of the debate on this topic.)

* A resource packet for this lesson containing copies of all source documents is available to Oregon educators at no charge from Documents Clerk, Oregon Department of Education, 700 Pringle Parkway SE, Salem, OR 97310; 378-3589. Resource Packets will not be available after June 1990.

2. Have students read "In from the Cold: 'Nuclear Winter' Melts Down" (above average readability) and "The Potential Effects of Nuclear War on the Climate" (average readability). You might wish to assign students to heterogeneous groups so that more able students can assist poorer readers grasp key ideas and concepts. A reading and/or study guide would also be useful. Discuss with students: (a) What does Seitz claim was the real reason for the emergence of the nuclear winter theory? What evidence does he provide to support his claim? (b) On what basis does Seitz attack the TTAPS model, upon which the nuclear winter theory was originally based? (c) Why, according to Seitz, have the voices of respected scientists critical of the theory not been heard? (d) What evidence does Seitz cite to disprove the theory of nuclear winter? (e) What conclusion does the Weinberger report draw from its review of the theory of nuclear winter? (f) What, if any, effect has Weinberger's conclusion had on U.S. national security policy?

3. Have students read "Commentary: Environmental Consequences of Nuclear War." After reading this article, ask students: (a) With what aspects of the nuclear winter theory do you agree or disagree? (b) How did you arrive at those conclusions? (c) Do you have enough information to support those conclusions? (d) What, if any, additional information do you require to support your conclusions? (e) Given your conclusions on the nuclear winter theory, what, if any, changes do you feel should be made in U.S. national security policy?

Extending the Lesson: 1. Have students communicate their views on the nuclear winter theory in an essay or oral presentation. (You may wish to require additional research or reading on the topic prior to this assignment.)

Evaluation: See item #1 procedure section for evaluation of Objective A. See item #3 procedure section and Extending the Lesson for evaluation of Objective B.

Topic: **The Debate: Potential Effects and Dangers of the Use of Modern Weapons**

Title: **The Characteristics of a Nuclear Explosion**

Source: Steven Saslow, The Catlin Gabel School, 8825 SW Barnes Rd, Portland, OR 97229, (503) 297-1894.

Essential Learning Skills: 2.1 (a,b), 2.3 (c), 3.1 (a,b,d,e), 4.1 (a,b), 4.2 (a,b,c,e), 6.2 (a), 6.4 (a,c), 6.5 (a,b), 6.6 (b,c).

Grade Levels: 10-12

Suggested Time: 2 days

Suggested Course Content: Science (biology, chemistry, physics, environmental studies), social studies, health

Objectives:

A. To learn accurate information about the short, intermediate, and long-term dangers of the use of nuclear weapons.

B. To describe uncertainties about the consequences of nuclear weapons.

Materials:

Slide shows

"The Consequences of Nuclear War," Thatcher and Orzack, the Harvard School of Public Health, 1983, Carolina Biological Supply Co, Gladstone, OR 97027.

"The Effects of Nuclear War," Office of Technology Assessment, U.S. Congress, 1979, Ch. 1, 2, 3.

"Nuclear War," Peter Goodwin, The Rutledge Press, New York, 1981, Ch. 2, "Nuclear Weapons and Their Effects."

The Encyclopedia Britannica; "Radiation Sickness," Emergency Management, the Federal Emergency Management Agency Glossary, World Health Organization.

Procedure:

A. Teacher states the learning objectives and invites students to participate in posing questions for study. For example, "It is our task to learn about nuclear weapons and their effects. What do you need to find out? What are your questions? What do you believe you need to know next?"

B. Teacher groups the questions into categories. Common categories include: how the weapons actually work; effects of the use of nuclear weapons on individuals, populations, places, and the environment; how it might be decided to use nuclear weapons; questions about radiation; the effectiveness of civil defense measures. Another common grouping is questions concerning the past, present and future. Teacher uses materials to prepare for day 2.

C. Teacher returns to class with an outline and teaches responding to student questions. "Does this answer your question? Do you have more questions?" The slide show may be used to answer questions about the effects of nuclear weapons on people, environment, etc. Handouts may be distributed from the source materials.

Note to Teachers: It is important that the teacher gauge the degree of concern, anxiety, fear, and denial among the students. Frightening students with details of human suffering is not an appropriate learning technique; nor, however, is avoiding the fact that nuclear weapons cause immediate health effects from trauma, burns, and radiation, as well as potential medical, social, environmental, and psychological effects in the post-attack period. The topic is so little taught that taboo and secrecy surround it, causing an unwarranted mystique which increases fear. For this reason, the "questioning" procedure is suggested. This procedure helps the teacher determine students' readiness for certain information.

Extending the Activity:

1. Have students produce a slide show of how nuclear weapons would affect their own city. For example, they would have to decide on the type of weapons, height of the blast, weather conditions, etc. Students could use government sources in their preparation. Student yearbook or newspaper staff might be contacted for help with photography and production. Students could interview other students, teachers, parents, etc. A field trip is suggested.

2. Invite an expert to discuss further students" particular areas of concern, as evidenced from their questions. For example, a health physicist to discuss radiation monitoring and effects on people, a doctor to discuss health effects of nuclear weapons, and potential consequences in the post-attack period, a city official to answer questions about civil defense measures for your town, a physicist to expand on questions about the mechanics of nuclear bombs. (There is a risk in inviting too many "experts." Besides bias problems, many students already believe they know so little about nuclear issues that they abdicate all decision-making to so-called "experts." The risk is students will be more reluctant to participate.)

These procedures can be repeated at different times in the high school years and will elicit different responses, which then direct the lesson content.

Evaluation:

<u>For the students:</u>
Could the students state what they wanted to learn?
Have students write an essay about subjects generated through the lesson(s).
Have students construct charts of nuclear weapons types, effects radiation symptoms, shelter possibilities, etc.
Could the students answer their questions after the formal lesson(s)?
Did students demonstrate an increase in knowledge by pretest/posttest or by teacher's assessment of student discussion or essay?

Topic: **Preventing War in an Armed World: Strategies and Institutions**

Title: **"The Strategic Defense Initiative ('Star Wars')"**

Source: The points of view developed as the basis for the activities below were prepared at the request of the Oregon Department of Education by the Citizens Defense Education Committee (Project Coordinator: Carl Gustafson, 5500 SW 190th Avenue, Aloha, OR 97007) and the Women's International League for Peace and Freedom, Portland Branch (Project Coordinator: Mary Bolton, 1061 SW Stephenson Court, Portland, OR 97219).

Both groups were directed to respond to the same questions in statements of approximately 500 words. Statements were prepared by each group separately without the benefit of give-and-take.

Essential Learning Skills: 1.2 (a), 2.1 (a), 3.1 (a,b,c), 4.1 (a), 6.2 (a), 6.4 (c,d), 6.5 (a,b), 6.6 (b)

Suggested Grade Levels: 10-12

Suggested Time: 3-4 class periods plus homework

Suggested Course Content: English language arts (speech, debate, composition, critical reading); social studies (global studies, international relations, U.S. history)

Objectives:

A. To understand in general terms what SDI is, its purpose and how it is intended to work.
B. To comprehend the nature of the controversies surrounding SDI.
C. To analyze and evaluate opposing points of view related to SDI.
D. To develop, support and express points of view related to issues surrounding SDI.

Activities:

<u>Objective A</u>

1. Have students read the "Overview" statements prepared by each group. Discuss (or have students respond in writing):

   SDI is a plan for multiple layers of defense, which consists of different systems designed to attack enemy missiles (ICBMs) in various phases of their flight.
   - What are the four phases of a missile's flight?
   - During which phase is it most preferable to destroy the enemy missiles? Why?
   - Why is destruction in other phases more difficult?
   - How will the enemy missiles be destroyed?

2. Have students draw a diagram showing how the SDI system is intended to work.

<u>Objective B</u>

3. Have students read and summarize the opposing points of view presented on each of the five questions. Discuss on which

issues do the two sides agree? How do they address the issues on which they do not agree?

Objective C

4. Have students work in small groups to analyze and evaluate the opposing viewpoints, either orally or in writing, or by using the six-step approach* given below:

Step 1. Identify the issues on which both sides agree.
Step 2. Determine the issues raised by one side which were omitted by the other.
Step 3. Identify issues on which both sides disagree.
Step 4. On any point of disagreement, determine reasons for the disagreement.
Step 5. Identify any other factors that must be analyzed concerning the issue in dispute.
Step 6. Use the arguments you have analyzed to construct your own opinion on the issue.

Objective D

5. Have students write and present a speech advocating either deployment or non-deployment of the SDI system.

6. Have students write an essay or Letter to the Editor expressing their views on the SDI.

Extending the Lesson: Have students do further research to debate any of the five questions addressed in this lesson, or other questions related to SDI.

NOTE: This lesson can be adapted to other issues of a controversial nature. In adapting the lesson make sure that the opposing viewpoints to be examined address the same question(s). However, if problem solving is the objective, do not use a approach that dichotomizes the issue. This allows for little examination of perspectives that fall between the two extremes or completely outside their domain.

Evaluation: Student responses to the discussion questions should be evaluated in terms of careful analysis and reasoning. Personal points of view should be supported by reasoned evidence; the role of values in developing points of view should also be recognized. Special care should be taken to emphasize that several points of view on SDI are appropriate. The major objective of the lesson is not on "what" but "how" the point of view was developed and articulated.

* From Economics and National Security: Supplementary Lessons for High School Courses, ©1987, p 116. The Mershon Center, The Ohio State University, Columbus, OH 43201. Reprinted with permission.

THE STRATEGIC DEFENSE INITIATIVE
(Women's International League for Peace and Freedom)

Overview

President Reagan's SDI, introduced in 1983, is a plan for a ground- and space-based defense against "strategic" (intercontinental ballistic) missiles. It is in early research stages.

The plan, as envisioned, is for a multi-layered defense consisting of different systems attacking enemy missiles in various phases of their flight: (1) boost phase, 3-5 minutes, when missile is first launched and upper portion of missile, containing warheads, is released; (2) post-boost phase, 2-5 minutes, when warheads, along with decoys and "penetration aids" such as chaff (strips of foil that confuse radar sensors) are released and placed on independent flight paths; (3) midcourse phase, 15-20 minutes, when warheads travel through space at speeds of over 10,000 miles per hour toward their targets; and (4) terminal phase, less than 1 minute, when warheads reenter the atmosphere and explode at their targets. Success depends on knocking out most enemy missiles in the boost phase, or in the first few seconds of the post-boost phase, while the missile still carries all its warheads and the booster's flaming exhaust plume makes the missile more easily detected and tracked by the space-based infrared (heat seeking) sensors. In later phases, when space is filled with tens of thousands of individual warheads, decoys and penetration aids, detecting and tracking are much more difficult.

The theory of SDI is that sensors would identify and track enemy weapons, target them for the interceptor and then determine if the target has been destroyed. Directed energy weapons, such as lasers and particle beams, energized by nuclear explosions, would intercept enemy missiles and discriminate between real warheads and decoys. Kinetic energy weapons, high-speed rockets and other projectiles would destroy missiles either with an explosive warhead or by a direct collision. Computerized battle management and other systems would tie these far-flung weapons and sensors together into a coordinated system.

SDI proponents visualize hundreds of space-based sensors, thousands of orbiting battle stations firing lasers or kinetic energy projectiles, numerous giant space-based mirrors for relaying laser beams from the ground, orbiting communications and battle management satellites, and tens of thousands of interceptor rockets based on the ground.[1]

Question: Can SDI be successfully deployed?
(Women's International League for Peace and Freedom)

Perhaps some form of a strategic defense could be lifted into space and stationed there. But a <u>successful</u> deployment would mean that in the event of a first strike by the Soviets, the SDI systems would all be able to function smoothly, as envisioned, to repel the attack. This is extremely unlikely.

The President's 1983 decision to develop SDI was made with almost no consultation with scientists or military leaders. As General Harley Hughes, Air Force Deputy Chief of Staff for Plans and Operations, has said, the SDI was "generated by the President and four years later the military [was] still

working very hard to come up with a...[military requirement] for SDI that makes sense, is militarily significant and cost effective."[2]

Some 6,500 scientists and engineers oppose SDI as impractical and dangerous.[3] An "Appeal by American Scientists to Ban Space Weapons" includes 57 Nobel Laureates among its signers.[4]

Some problem areas: Testing--SDI would have to work right the first time, without having ever been tested in realistic battle situations. Tests of individual components under artificial, carefully controlled conditions will give no guarantee that the entire system can spring to life automatically and detect, identify, attack and destroy thousands of targets, many of which may be actively attacking, jamming, blinding or deceiving the SDI system.[5]

Computers--All weapons would depend on computers for interpreting sensor data, handling communications and other tasks. Computer software is the most difficult technical problem facing SDI. In 1985, Dr. David Parnas resigned from the SDI computing panel, saying, "Because of the extreme demands on the system and our inability to test it...we'd never know if we had it [battle management] right and we'd never be able to trust it."[6]

Technologies--Not one SDI test has demonstrated a genuine breakthrough. For example, in a 1985 experiment the "MIRACL" chemical laser burned a hole in an old Titan missile which was fixed to a platform on the ground about half a mile away. The test proved nothing. Lasers have been used to burn holes in metal for years, but that is different from destroying high-speed targets at ranges of thousands of miles. Recently kinetic energy weapons, that destroy through impact, have been emphasized in the interest of early deployment, because the basic technology is already in place. One of these, the space-based interceptor (SBI) was rejected in 1982 by the Air Force. The concept has no more merit today. Two other ground-based kinetic weapons for the midcourse and terminal phases are also meeting many technical obstacles.[7]

Lasers would have to maintain near perfect accuracy long enough to inflict damage on targets traveling at more than 10,000 miles per hour, up to 3,500 miles away. The mirror for a laser weapon might have to be 40-50 feet across and would have to withstand enormous temperature changes. Anything short of perfect reflection would result in destruction of the mirror by the laser itself.[8]

Question: Would SDI be an effective defensive system?
(Women's International League for Peace and Freedom)

It is highly unlikely that SDI would be effective. Soon after research began it was acknowledged by supporters that President Reagan's claim that SDI would be a protective shield for all the people was incorrect.[9] Since 1984, the SDI program has been aimed at assuring the survival of missile silos and military posts rather than cities and people. A 1985 Pentagon report to Congress stated that with SDI the U.S. seeks not to replace its deterrence policy, but to enhance it.[10] This is a wasted effort because our deterrence needs no enhancement. We have a huge retaliatory force on submarines and bombers almost totally inaccessible to Soviet missiles. The Soviet Union knows that if it engages in a first strike it will be devastated by our retaliatory missiles.

Also, SDI would provide no defense against most cruise missiles, submarine-deployed missiles that are low-trajectory or missiles carried on bombers. These contain more total explosive power than is needed to devastate both countries.[11]

According to the American Physical Society, judged to be the most prestigious organization of U.S. physicists, all directed-energy weapons such as lasers need improvements in power output and beam quality requiring at least a decade of research before an "informed" decision can be made about potential effectiveness and survivability. Development and testing could not begin before the 21st century.[12]

The SDI space stations would be extremely vulnerable to countermeasures that are effective and readily available to the Soviet Union: (1) destruction of space platforms by small missiles, by land-based lasers, by armed satellites; (2) encasing of missiles in laser beam-absorbing materials; (3) masking of missile launches with smoke screens; (4) haphazard launching patterns to force constant re-directing of laser; (5) launching of dummy missiles to use up destructive power of SDI.[13]

A number of U.S. scientific publications have listed these same measures as strong possibilities. And Bernard Feld of M.I.T. has said that a small rock, dispatched by a very small missile, could punch a hole in the fuel tank of a laser system and render it inoperable.[14]

The Soviets could deploy space mines which would hover close to our kinetic weapons platforms until ordered to explode. These relatively simple devices would probably be easier to develop and more reliable than ground-launched interceptors, and they could attack all platforms simultaneously. They could also be fused to explode when tampered with.[15]

The Soviets could attack directly the space-based interceptor (SBI) satellites with anti-satellite weapons (ASATs) just before launching a first strike. They could also shorten the boost and post-boost phases of their missiles, since the key to "success" for our SDI would be to get as many missiles as possible knocked out during these first two phases before individual warheads are released.[16]

The Soviets could double their number of warheads on ICBMs at a fraction of the cost of SDI and overwhelm our SDI system.[17] And if President Reagan continues to erode the ABM Treaty and SALT II (see Section 5) the Soviets will be free to do this very thing, without restrictions.

Question: Would SDI render nuclear weapons "impotent and obsolete"?
(Women's International League for Peace and Freedom)

One aspect of this question has to do with claims that SDI would be "non-nuclear." Actually, 10-15 percent of SDI's budget is being used to research exotic new "third generation" nuclear weapons (weapons energized by nuclear explosions--X-ray lasers, microwaves, pellet "shotguns").[18]

To provide power for these weapons, and for the orbiting battle stations, the Administration is funding development of high-power space-based nuclear reactors. Use of nuclear power in space poses serious safety hazards. Of the approximately 50 U.S. and Soviet nuclear-powered space missions undertaken to date, nearly 20 percent have ended in failure. Some have come very close to causing devastating radiation fallout.[19]

A launch-time accident involving a new space reactor would cause a low release of radioactive material. During the mission in space the reactor would produce a large quantity of radioactive products. Thus, at the end of the reactor's service (and in the case of one model this would be after only 7 years) a reentry accident could result in disastrous radiation over a large area. Also, premature reentry can be caused by a strike against the reactor, or collision with a meteoroid or space debris, resulting in health-threatening fallout.[20]

Enhanced Deterrence--The other aspect of the question has to do with existing nuclear weapons stockpiles. The role of SDI has admittedly moved from protecting all our people to simply adding support for our deterrence policy of "Mutually Assured Destruction" or MAD. Under MAD each country has sufficient second-strike nuclear weapons to retaliate and devastate the other if it engages in a first strike. Thus, the major role still goes to our nuclear weapons, with SDI playing a supportive role. Certainly MAD is a precarious policy, but it is not as dangerous as SDI.

If President Reagan sees nuclear weapons as becoming impotent or obsolete, why is he funding the development of four very expensive offensive nuclear weapons systems? They are the MX intercontinental missile (ICBM); the Trident II D-5 submarine-launched ballistic missile; the mobile, small, one-warhead Midgetman ICBM (which the Pentagon wants to equip with more warheads); and sea- and ground-based cruise missiles. Based in the old Minuteman silos, the MXs are too vulnerable to serve as retaliatory weapons. Their only value is for first-strike. And the Trident D-5, of which there will eventually be over 4,000, differs from the C-4 that it replaces only in its extremely high accuracy. It can be used as a first strike weapon to knock out missiles in their silos before they can be launched.

President Reagan does not need these as bargaining chips. The Soviets want deep cuts in strategic weapons. The stumbling block to negotiation is SDI.

The Soviets are reluctant to go beyond basic research in space defenses for economic reasons and because of concern about an unrestrained arms race in space,[21] but they could easily counter SDI with offensive measures that could penetrate the SDI shield. Historically and technologically, offense is easier and cheaper than defense.

Question: Can the U.S. afford ($) to deploy SDI?
(Women's International League for Peace and Freedom)

The U.S. cannot afford to deploy SDI. A fully deployed SDI to "protect the population," even though it could not do the job intended, would cost about $1 trillion, according to former Defense Secretaries James Schlesinger and Robert McNamara.[22] This is a staggering sum of borrowed money--$1 million per day for the next 2,730 years. Even the limited substitute to protect only missile silos would cost several hundred billion dollars.[23] We need that money for more urgent matters.

Military budget items compete directly with civilian needs--health, housing, child welfare, etc. But there are also close links between military and more hidden socio-economic priorities. Their effects may be slower-acting, but they are deeply debilitating for the economy. To mention a few:

- Military programs lay claim to a disproportionate share of our trained personnel and research talent. As a result, investment, productivity and our competitive strength in international markets suffer.
- The military emphasis on high technology produces relatively fewer jobs than would be created by comparable sums spent for education, health, inner-city housing and other civilian needs. Unemployment rises.
- Military production yields goods that are destroyed or used up without creating a solid foundation for future production. Growth lags.[24]

Our move from the world's largest net creditor to its largest debtor is tied closely to the recent sharp rise in our military outlays.[25] There are ties between loss of commercial markets and our intense preoccupation with the military. For instance, U.S. government-supported research priorities, in their emphasis on weapons rather than commercial products, have been the exact opposite of the policies of America's major trading partners. In the U.S. only 25 percent of the government research budget relates to products for the civilian market; in Europe, 70 percent is civilian. While we spend $600 million for **military** applications of supercomputers, Japan spends $700 million on the **commercial** applications of supercomputers. We spend on education (needed to train and maintain a high quality, skilled work force) barely 3/4 of what we spend on the military. West Germany spends 40 percent **more** on public education than on military defense and Japan five times more.[26]

Some supporters of large military spending see commercial spin-offs from technologies developed in military-related research as compensating for the heavy military drain of our scientists and technologists. But studies have shown that that spin-off is too weak to compensate for the drain.[27] A former chief scientist of our ICBM program has said that 30 years of military emphasis has held us back 20 years in our technological advance.[28]

Not only can we not afford SDI economically, we also cannot afford it in terms of national security, since with its alarming offensive potential (see Section 5) it would move the arms race into space. We are safer without it.

Question: Would SDI create a "first strike" mentality in the Soviets?
(Women's International League for Peace and Freedom)

SDI would foster preemptive first strike thoughts in the Soviets.

Erosion of the ABM Treaty

The 1972 Anti-Ballistic Missile (ABM) Treaty prohibits both sides from developing, testing or deploying missile defenses that are sea-, air-, space- or mobile land-based. It permits them to develop, test and, on a limited basis, deploy only fixed, ground-based missile defenses. The U.S.S.R. has, near Moscow, a permitted limited land-based system considered primitive by our scientists.[29] We did have one at a missile site but dismantled it because we could see it had no usefulness.

Contrary to pronouncements from the Reagan Administration, the Soviets have had a good overall record in compliance with arms control agreements.[30] But President Reagan's unilateral re-interpretation of the ABM Treaty has put the U.S. on a collision course with the treaty and it could bring testing violations as early as 1989. If the crucial ABM Treaty goes down the drain, and particularly if the U.S. also continues exceeding SALT II limitations, we will be inviting the Soviets to join us in a run-away arms race in space.

Offensive Potential of SDI

The techniques for destroying ballistic missiles in flight can also be used for many offensive roles. The space-based interceptor could be modified to attack ground targets, such as early warning radars. Laser weapons could also be used to attack ground targets. A 1985 study by R&D Associates concluded that "a laser defense system powerful enough to cope with the ballistic missile threat could also destroy the enemy's major cities by fire."[31] The lasers could destroy airfields and other relatively unprotected military targets.[32] The Soviets are **well aware** of these dangers contained in SDI and have commented on them.[33] A perfectly normal Soviet reaction to the offensive potential in SDI would be thoughts of preemptive first strike at time of crisis.

SDI as an Adjunct to a U.S. First Strike Policy

As a **defense** against a first strike, SDI would not work, because if even 5 percent of the 6,000 warheads on Soviet land-based ICBMs leaked through our shield in a Soviet first strike attack, those 300 would be enough to devastate our country. But if **we** launched a first strike, the Soviets could retaliate with perhaps 300 warheads that we had not knocked out and our system would probably stop enough of that small number so that the damage to us would be what is considered "acceptable" by military planners.[34]

210

Pairing of SDI with development of an arsenal of new lethal first strike weapons is alarming to the Soviets. Whatever U.S. intentions may be, if the drive continues Soviet leaders will conclude that we are preparing for an unanswerable first strike. If at some time they feel an American attack is imminent their response may be to launch a preemptive strike of their own.

In President Reagan's speech introducing his Star Wars vision he said, "I clearly recognize that defensive systems have limitations and raise certain problems and ambiguities. If paired with offensive systems, they can be viewed as fostering an aggressive policy."[36] Having expressed that opinion, he should certainly understand Soviet fears about our pairing of SDI with a highly lethal first strike arsenal.

Peace would best be served by canceling SDI and negotiating large mutual reductions in nuclear arsenals, as a first step toward nuclear disarmament.

Footnotes for STRATEGIC DEFENSE INITIATIVE
(Women's International League for Peace and Freedom)

1. "Star Wars: Fantasy vs. Reality," in PREPARE, a briefing paper published by NATIONAL IMPACT, a legislative information network sponsored by national agencies of 23 Protestant, Catholic and Jewish groups (100 Maryland Avenue NE, Washington, DC 20002), October 1986.

2. "Star Wars Reality: The Emperor has no Clothes," DEFENSE MONITOR, Vol. XVII, #1, 1988, page 2. (Published by Center for Defense Information, 1500 Massachusetts Avenue NW, Washington, DC 20005.)

3. Washington Spectator, September 1, 1986. (Published by The Public Concern Foundation, PO Box 442, Merrifield, VA 22116.)

4. Mailing from the Union of Concerned Scientists, 26 Church Street, Cambridge, MA 02238. Winter 1988.

5. "Star Wars: Vision and Reality," DEFENSE MONITOR, Vol. XV, #2, 1986, page 6.

6. DEFENSE MONITOR, Vol. XVII, #1, page 5.

7. Ibid., page 4-5.

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THE STRATEGIC DEFENSE INITIATIVE
(Citizen's Defense Education Committee)

Overview

The system concept for SDI is for multiple layers of defense. These layers would engage the offense weapon in two or more of its flight phases--boost phase, post-boost phase, mid-course phase and terminal phase. One version of the concept envisions installing the first and last layers soon, using currently available, proven hardware. The post-boost and mid-course layers would be added as components are perfected and proved out.

Sensors, mounted in satellites along with computers, would detect the targets and direct attack by rockets or other kill devices which are mounted in other satellites or on the ground. Attack during boost phase would be preferable because the missile exhaust is hot (easily detected) and the target is very large. During the post-boost phase detection is more difficult but the target is still large and individual warheads (MIRV's) and decoys are not yet deployed. After separation the number of targets are much smaller and cold.

During the reentry or terminal phase targets are again heating and are easier to detect. They are vulnerable to damage from pellets, bullets or any device which can cause excessive heating and burn-up in the atmosphere.

Question: Can SDI be successfully deployed?
(Citizen's Defense Education Committee)

There now seems to be general agreement that a combination of a boost phase, satellite based defense and a ground- or ground-and-space based terminal phase defense can be deployed successfully. Even the opponents of SDI concede this much. Recent demonstrations of ground-based extra-atmospheric intercept missiles and multiple projectile systems such as heavy, fast-firing machine guns, have shown feasibility of terminal phase defense.

Developments of heat-seeking detectors, microminiaturized computers, small target-seeking missile and effective kinetic energy warheads have convinced even skeptics that the boost phase defense can be successful. Indeed, all of these components have been successfully tested.

The argument, then, seems to center on the post-boost and mid-course phases--can they be developed and are they necessary? Since best estimates indicate a kill probability of about 90 percent for the boost and terminal phases combined, it would be highly desirable to increase overall effectiveness by adding some capability during post-boost or mid-course phases. The target cools during post-boost but is still large and is one piece. During mid-course, multiple warheads have been deployed along with decoys.

The most difficult problems, then, for an SDI occur during the coasting period. Detection is complicated by reduced target temperature and deployment of decoys and attack methods must deal with smaller targets. Recent tests of a "laser" show good capability to discriminate between decoys and warheads. This development is a radar/laser combination which provides very fine measurements of target characteristics. Space-based x-ray lasers and high power

ground-based lasers offer promise of more exotic kill systems for the near-term future, but impact-type homing rockets have been tested successfully. These rockets can also be used to defend satellites against attacks by space mines or other anti-satellite weapons.

An attractive program for deployment of an SDI would consist of a phase-by-phase approach. The terminal phase consisting of guns, multiple rockets and possibly large lasers can be initiated at any time. Large ground-based missiles can also be deployed to provide defense during late mid-course phase. A configuration for boost-phase system can be designed now and deployed in less than ten years. Additions for the other phases and improvements would be planned as they are proved to be cost-effective. An advantage of this approach is a spreading of costs over many years while some protection is achieved in the near-term.

Question: Would SDI be an effective defensive system?
(Citizen's Defense Education Committee)

Since the 1972 signing of the Anti-Ballistic Missile Treaty, "the U.S. and the U.S.S.R. guaranteed that each country would keep its people undefended against a nuclear attack by the other side." While the agreement seems incredible, the thinking behind the strategy of "Mutual Assured Destruction (MAD)" is that both sides know that if they launch a missile attack, their own homeland will be destroyed in reprisal, thus they are deterred from starting a war.

When President Reagan came to office, he was troubled by the inhumanity of MAD. Because of that policy, if informed that Soviet missiles were on their way, he would be required to issue an order that would reduce millions of Soviet civilians to charred corpses.

In 1983 he proposed that we rise above the threat of retaliation as the only deterrent and the scientific community was challenged to devise a defensive shield against the weapons of an enemy. Strategic Defense Initiative or the "Star Wars Project" was born.

Technologies that are already in hand allow us to put a simple defense in place in the early 1990's. This limited defense will be based on the off-the-shelf technology of the smart "bullet." The key to the smart bullet is the miniaturized computer. Defense technicians have the means for building elaborate computer brains into a small missile so that it can steer itself toward a target. Sensing the target by its delicate emanation of heat waves or by its radar reflections, the "smart bullet" analyzes the product of its senses within its computer brain and directs a succession of messages to small rockets around its circumference. Delicate thrusts by these rockets steer the defending missile into the path of the oncoming ICBM warhead.

Destruction is by direct impact or command explosion of the smart bullet releasing a cloud of flying metal fragments in the path of the missile.

The smart bullet does not have to destroy the warhead to be effective, it only has to prevent the nuclear weapon from exploding. That happens to be fairly easy because nuclear weapons do not go off very readily. Elaborate arrangements and a great deal of fragile electronics are needed to make one explode. Accordingly, a high speed cluster of high speed metal fragments will usually be sufficient to disarm the weapon's mechanism.

"Smart bullets" weigh about ten pounds and are non-nuclear. They travel at speeds of about four miles per second. It is conservatively estimated that this system would be 80-90 percent effective against missile attack.

Knowing this, the Soviets must realize that enough of our retaliatory forces would survive, that a first strike option would be out of the question.

Question: Would SDI render nuclear weapons "impotent and obsolete"?
(Citizen's Defense Education Committee)

SDI is envisioned to defend against ICBM's and SLBM's and, to some extent not yet determined, against bombers and cruise missiles. Other nuclear weapons such as artillery, mines and naval applications would be different problems.

Nuclear technology is here, the "bomb" is here and nothing can make it go away. Until every squabble between nations and every malevolent person's thoughts have been ameliorated there will always be a chance of the use of nuclear weapons. The best bet now is to provide unacceptable costs and risks for those who might contemplate initiating nuclear war.

The concept of defense against ICBM's and SLBM's, especially in a first strike situation, is two-pronged. If an enemy chooses to attempt a first strike SDI can limit the number of warheads which will reach their targets to as little as 2-4 percent. Unless an extremely large number are launched this would not achieve the necessary elimination of a U.S. counter force response. Our remaining counter force missiles would then inflict an unacceptable level of destruction on the enemy. Faced with these odds no reasonable leaders would choose to strike.

The other prong derives from the likelihood that no nation will be willing to expend the resources necessary to build a first strike force large enough to meet the requirement that it eliminate its opponent's counter strike missiles. In terms on Soviet SS-18 missiles, this would require them to deploy on the order of 40,000-50,000 additional warheads, an astronomical cost.

An argument sometimes advanced in this respect is that SDI will protect the U.S. but will give us an advantage. Two solutions are available: (1) other nations can "go in with us" or build their own, (2) the U.S. can continue to refrain from building a first strike missile force.

In short, since SDI will render ICBM and SLBM forces obsolete or ineffective, nations will no longer need to spend large sums on these weapons and chances of a major nuclear war essentially will be eliminated.

Question: Can the U.S. afford ($) to deploy SDI?
(Citizen's Defense Education Committee)

One answer comes immediately to mind -- we cannot afford not to!

Let's first consider what it might cost. The estimates vary widely, ranging from $60 billion for an intermediate two-layered defense using kinetic technologies to $1 trillion for a multi-tiered system with exotic technologies. All figures will remain conjectural however until more is known about technologies involved.

The Pentagon estimated research and development costs at $27 billion for the five-year period 1985-89. That estimate has not been exceeded. It represents less than 2 percent of projected defense spending and less than 15 percent of our current level R&D budget.

Defense analyst Colin Gray states a full deployment cost of $500 billion would represent 8 percent of defense costs over the next 20 years, assuming a constant defense budget of around $300 billion.

In any discussion of costs, the dollars spent on defense of our freedoms must first be brought into true perspective. Often blamed for the deficit because of widely publicized overcharges ($900 coffee pots or hammers--those ridiculous contractor billings incidentally were discovered and reported by the military themselves), the defense portion of our total budget has continued to shrink against other expenditures for years. (The same is not true of our ideological adversaries who now out-spend us by a considerable margin.)

Arguments against SDI on economic grounds are often exaggerated and the Union of Concerned Scientists claimed that 3,400 battle stations would be necessary for effective defense. It now is determined that 45-59 are needed. Also, history demonstrates that technological breakthroughs lead to striking reductions in product costs. For example, a $3,000 personal computer of today has essentially the same capabilities of a $5 million IBM 'mainframe' computer of the mid-1960s. The same economic arguments against development of the computer were used at that time.

Finally, we should look at savings in other areas. We currently spend an estimated $40 billion or 13-14 percent of the defense budget on Strategic Offensive Systems. That area includes the modernization of the U.S. Strategic Triad, the B-1 bomber, the Ohio Class submarine with the new Trident D-5 missile and production of the MX missile. It would be necessary to maintain a sizable deterrent during a transition era from assured destruction to strategic defense but eventually the cost of SDI would be at least partially offset by reductions in the offensive weapons systems.

The above hopefully demonstrates that Strategic Defense <u>is</u> dollar affordable but cost alone must not be the only criteria in deciding its merit.

What price would the American public be willing to pay to defend the nation against nuclear annihilation? In this unstable nuclear world with its mere handful of players, what will the situation be by the year 2000 with a dozen

nations possessing the capability? A system of defense that drastically reduces the dangers of nuclear holocaust is an investment in the future of civilization we simply cannot afford to be without.

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Question: Would SDI promote a first strike mentality among the Soviets? (Citizen's Defense Education Committee)

The answer to the question of whether or not a nuclear missile defense system for the U.S. will increase the likelihood of Soviet leaders considering a first strike against us is very obvious--NO! It is widely accepted that the Soviets will not attempt a first strike unless their "empire" is threatened. A clearly superior strike force, however, might be used by them to threaten us. Although they probably have a first strike capability now, they may be reluctant to threaten openly for two reasons: (1) their world expansion program has been successful despite recent reverses, and (2) their economy is in such poor shape they probably could not persist in a drawn-out conflict.

Since the U.S. does not have a first strike capability, and has designed its strategic missiles as a deterrent to prevent war, Soviet planners know they need not fear a first strike from us. In addition, we must remember that the Soviets have the world's only deployed and operational anti-missile defense and have been working on advanced systems similar to our SDI concept for much longer than we have. The Soviets have spent more money and are further advanced in some area than the U.S. Some experts consider them very close to breaking out of the ABM Treaty restrictions and deploying a more advanced missile defense system. Our only option then would be immediate and rapid deployment of SDI.

What does an operational and deployed SDI accomplish? Primarily, it eliminates the advantage of a first strike because a successful first strike implies negating the enemy's counter-strike capability. Since SDI will protect our primary deterrent force, a Soviet planner will know that no matter how many missiles he may launch in his first strike, we will still be able to inflict unacceptable damage on his country.

Although recent books written by Soviet military leaders stress the need for surprise in any confrontation with the west, we must realize that this is only standard military strategy. The value of SDI as a deterrent to Soviet first strike, or even surprise initiation of conventional warfare, is its impact on the political leaders in the U.S.S.R.. Clearly, the political leaders still hold to Leninist theory of "two steps forward and one backward," which is another way of saying their march toward world socialism demands patience.

Arguments to the contrary, we do not have a first strike capability because we do not have highly accurate missiles in sufficient quantity and with large enough warheads. The Soviets know this and so long as this does not change they should not consider SDI an offensive danger to them.

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Publications (Books, Pamphlets, Magazines, Articles) 242
Teaching Resources 246
Organizations 250
Supplements and Bibliographies 252

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Organizations

American Nuclear Society, 555 N. Kensington Avenue, La Grange Park, Illinois 60525

Campaign for U.N. Reform, 418 7th Street, SE, Washington, D.C. 20003

Citizen's Defense Education Committee, PO Box 30205, Portland, OR 97230-0205

Educators for Social Responsibility, 23 Garden Street, Cambridge, MA 02138 (Portland ESR, Multnomah Arts Center, 7688 SW Capitol Highway, Portland, OR 97219)

Fellowship of Reconciliation, 1838 S.W. Jefferson, Portland, OR 97201 (National Association: Box 271, Nyack, NY 10960)

National Peace Institute Foundation, 110 Maryland Avenue, N.E., Washington, D.C. 20002

Roosevelt Center for American Policy Studies, 316 Pennsylvania Avenue, SE, Suite 500, Washington, D.C. 20003

SANE/FREEZE, 711 "G" Street S.E., Washington, D.C. 20003

The Ground Zero Pairing Project, PO Box 19049, Portland, OR 97219

United Nations Association of the United States of America, 485 Fifth Avenue, New York, NY 10017-6104. (Oregon State UNA-USA President: Jim Nofziger, Willamette University Law Dept.)

World Federalist Association, 418 Seventh Street, SE Washington, D.C. 20003

World Policy Institute, 777 United Nations Plaza, New York, NY 10017.

Youth For Peace, a support group for middle school and high school students interested in peace and justice, meets weekly in the Peace Room at the YWCA, 768 State Street, Salem, OR. For more information contact Loriann Dowlan at 581-9922.

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- American Security Council, Washington Communication Center, Boston, VA 22713
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- Center for Defense Information, 303 Capital Gallery West, 600 Maryland Avenue, SW Washington, D.C. 20024.
- Council on Economic Priorities, Attn: Military Information Center, 84 Fifth Avenue, New York, NY 10011.
- Department of Defense, Office of Ass't. Secretary of Defense, Attn: Defense Directory for Information, Room 2E777, Washington, D.C. 20301.
- Institute for Policy Studies, Nuclear Weapons Research Project, 1901 Que Street, NW, Washington, D.C. 20009

- International Institute for Strategic Studies, 23 Tavistock Street, London, England WC2E7NQ.
- Union of Concerned Scientists, 26 Church Street, Cambridge, MA 02238.
- "World Military and Social Expenditures" (This pamphlet is updated yearly and is available in many libraries. Individual copies ($4.00) can be obtained from World Priorities, Inc., Box 1003, Leesburg, VA 22075.)

Resource Organizations for Civil Defense Issues

Doctors for Disaster Preparedness, 118 Court Street, PO Box 1057, Starke, FL 32094

Emergency Response Institute, Inc., 1819 Mark Street NE, Olympia, WA 98506

Federal Emergency Management Agency (FEMA), 500 "C" Street, NW, Washington, D.C. 20472

Illinois Valley Civil Defense Council, William T. Atkins, Chairman, PO Box 1277, Cave Junction, OR 97523

Jackson County Civil Defense Council, Andy Dudley, Co-Chairman, 4544 Cloudcrest Drive, Medford, OR 97504

Rogue Valley Civil Defense Council, Richard Armour, President, PO Box 5123, Grants Pass, OR 97527

The American Civil Defense Association, PO Box 910, Starke, Florida 32091. (newsletters)

The American Homeland Defense Alliance, PO Box 1159, Cave Junction, OR 97523 (lobbying organization)

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